

INTEGRATED
Environmental Services, Inc.

April 13, 1998

Via Facsimile and Federal Express

James E. Ross, P.E.
Unit Chief, Site Cleanup Unit
Regional Water Quality Control Board
Los Angeles Region
101 Center Plaza Drive
Monterey Park, CA 91754-2156

Subject: Response to RWQCB Memo re. Post-Demolition Risk Assessment, March 31, 1998

Project: Boeing C-6 Facility, Parcel A, Los Angeles (RWQCB File No. 100.315)

Dear Mr. Ross:

On behalf of Boeing Realty Corporation, Integrated Environmental Services Inc. is pleased to submit for your review the attached document pertaining to the C-6 facility, Parcel A. We are delighted to report that the incorporation of the Regional Water Quality Control Board's (RWQCB's) review comments has resulted in a reduction of projected risks. However, the fundamental finding of the risk assessment, "no significant risk," has not been altered. The proposed change pages for the RWQCB comments have been enclosed for your review. In addition, this document has been prepared so that it may be incorporated into the final post-demolition risk assessment front matter.

Comment 1: Our Calculation for the following equations, using the data provided, indicated the following:

<u>Equation</u>	<u>Site-specific soil parameters</u>	<u>PDRA soil parameters</u>
5-5 (g/cm3)	1.45E-3	2.63E-3
5-12 (mg/cm2-s)	2.32E-15	7.32E-13

Please provide recalculations of the above and enter the appropriate values.

Response: Equation 5-5 of the post-demolition risk assessment should read as follows:

$$K_{as} = H' / (R \times T \times K_d) \quad (5-5)$$

where

- H' = COPC-specific Henry's Law constant (atm-m³/mol), from Table 5-3
R = ideal gas constant, 8.206 × 10⁻⁵ atm-m³/mol/K
T = temperature in Kelvin, 293 K
K_d = soil-to-water partitioning coefficient (cm³/g), K_{OC} from Table 5-3 times fraction of organic carbon in soil matrix, 0.004 unitless (Cal/EPA 1994)

J.E. Ross

April 13, 1998

Integrated has provided a change page (5-12) to address these corrections. The K_{as} values calculated in the post-demolition risk assessment and the response to RWQCB's March 11, 1998 review comments are correct.

Integrated concurs with RWQCB findings for the calculated flux rates presented in Section 5 of the post-demolition risk assessment and the response to RWQCB comments dated March 20, 1998. The unit conversion factor presented in equation 5-12 was not included in the calculation of AOPC flux rates. The impact of this inadvertent omission was to overestimate potential risks by three orders of magnitude for exposures to outdoor air. Cumulative effects on the findings of the post-demolition risk assessment and associated potential health impacts are insignificant. However, the proposed change pages (5-20, 5-23, 6-12, 8-3, and Appendix B) have been enclosed to allow the reviewer to replicate the exposure assessment process.

Comment 2: The following revisions must be made in the report:

1. *The March 20, 1998, response stated that "The D'Agostino's test results were inconclusive..." and this determination should be stated in the final report page 5-5, and any other relevant sections in the report. Please also clearly describe the determination of data distribution in the report, i.e., that the determination is based on histogram plots, not on the results of the D'Agostino's test.*

Response: Text has been added to pages 5-4 and 5-5. The proposed change pages are enclosed.

2. *Units expressed in equation 6-2 are inconsistent in the March 6, 1998, report. The unit for VF and PF should be in m³/kg.*

Response: The units have been corrected on pages 6-4 and 6-5. The proposed change pages are enclosed.

3. Henry's law constant H expressed in equation 5-5 should be denoted as H' to be consistent with Table 5-3.

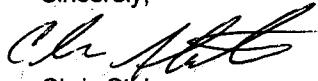
Response: The "prime" mark has been added in the equation to be consistent with Table 5-3. The proposed change page 5-12 is enclosed.

Comment 3: The response to our March 11, 1998 letter shall be incorporated into the final report, to demonstrate the conservative approach used in this project.

Response: Integrated is enclosing the comparative analysis conducted in response to RWQCB's March 11, 1998, review comments. This response to comments document should be included in the front matter of the post-demolition risk assessment. The calculated values for equation 5-12 have been corrected in accordance with RWQCB comment 1, above.

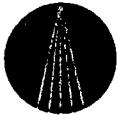
I appreciate the opportunity to work closely with you and your staff on this important project. Should you or your staff have any further questions concerning the Post-Demolition Risk Assessment, please feel free to call me directly at (714) 852-9050, extension 20.

Sincerely,



Chris Stoker

CC. Mario Stavale, Boeing



INTEGRATED
Environmental Services, Inc.

March 20, 1998

Via Facsimile and Federal Express

James E. Ross, P.E.
Unit Chief, Site Cleanup Unit
Regional Water Quality Control Board
Los Angeles Region
101 Center Plaza Drive
Monterey Park, CA 91754-2156

Subject: Response to RWQCB Memo re. Post-Demolition Risk Assessment, March 13, 1998

Project: Boeing C-6 Facility, Parcel A, Los Angeles (RWQCB File No. 100.315)

Dear Mr. Ross:

Integrated has reviewed the comments prepared by the Water Board and has prepared the following materials to further address the remaining two comments.

Comment 1: *To evaluate the chemical concentration data, as discussed, we require statistical soil data for the following constituents of potential concern (COPCs) in Table 2-1 (page 2-10): 1,1-dichloroethylene, aroclor 1248, aroclor 1260, benzo(b)fluoranthene, dibenzo(a,h)anthracene, naphthalene, tetrachloroethylene, trichloroethylene, total xylenes, and arsenic. Please provide us with the following data for the COPCs listed:*

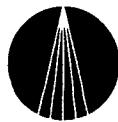
- a) *a histogram plot of field soil data to show distribution.*
- b) *the D'Agostino's test results to show either the normal or log-normal distribution.*

Response: The data set used in the derivation of exposure point concentrations includes over 200,000 records as presented in Supplemental Books 1-5 of the March 6, 1998, version of the Post-Demolition Risk Assessment (PDRA). Integrated has performed numerous statistical evaluations of the data set prior to the development of the PDRA. The following addresses the RWQCB requested statistical analyses.

- a) *a histogram plot of field soil data to show distribution*

Histograms have been prepared for each of the COPCs as requested by RWQCB in Figures 1-14. A third party statistical analysis software package, *Statistica™*, by StatSoft was used to analyze the COPC hits. Histograms could not be developed for Aroclor-1248, Aroclor-1260, and dibenzo(a,h)anthracene due to their extremely limited detection frequency. These organics were each detected a total of five times in Parcel A. However, these organics have been assumed to be distributed in an identical manner to the other organic constituents evaluated in the PDRA.

Arsenic was the only COPC anticipated to exist throughout the site and thus demonstrate a normal distribution. All other COPCs (organics) were assumed log normally distributed. The enclosed figures demonstrate that the assumptions used in the PDRA concerning the distribution of organic and inorganic constituents at the site were acceptable.



James Ross
March 20, 1998

Figure 1
Fit-Test Distribution Histogram: Assumed Normal

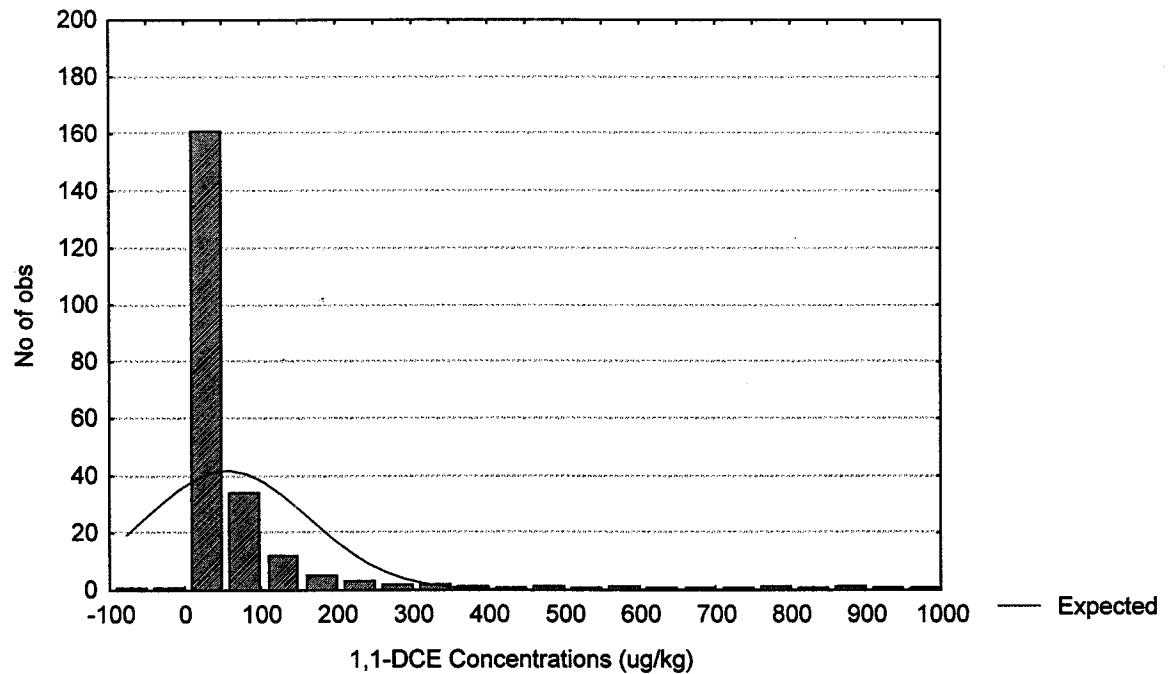
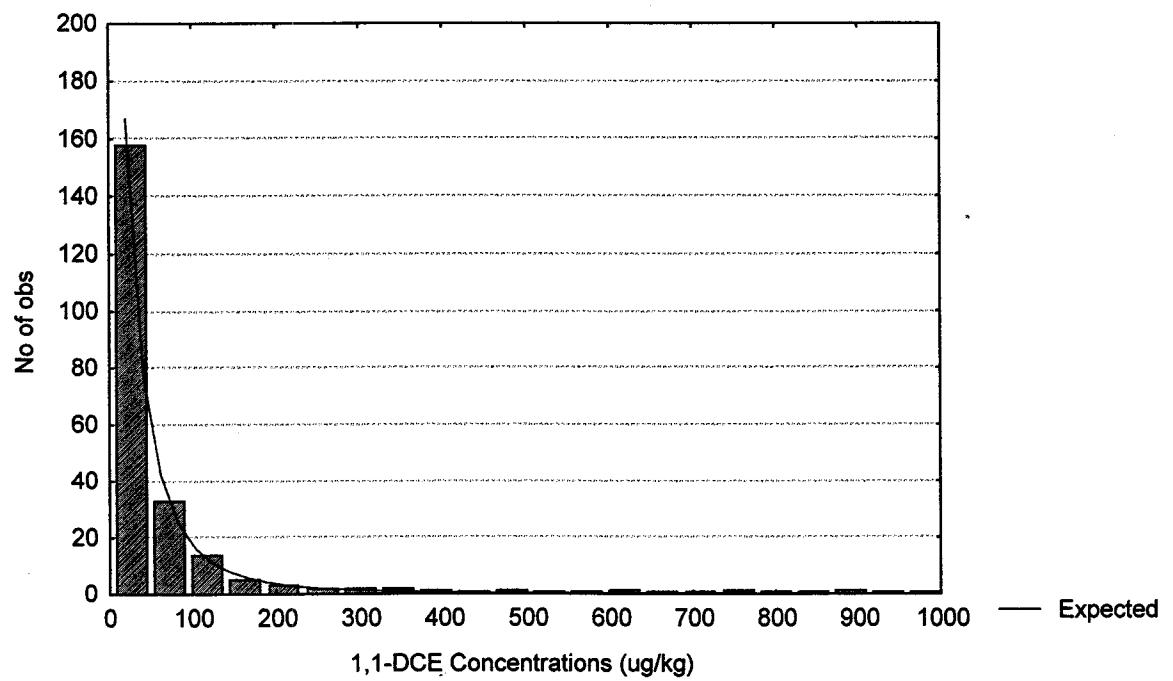
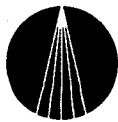


Figure 2
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 3
Fit-Test Distribution Histogram: Assumed Normal

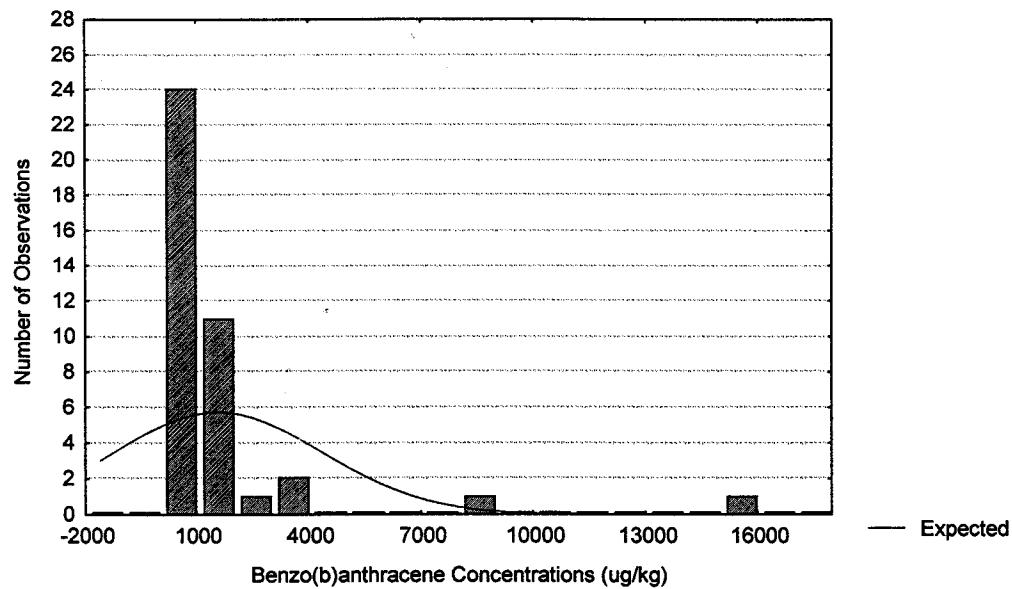
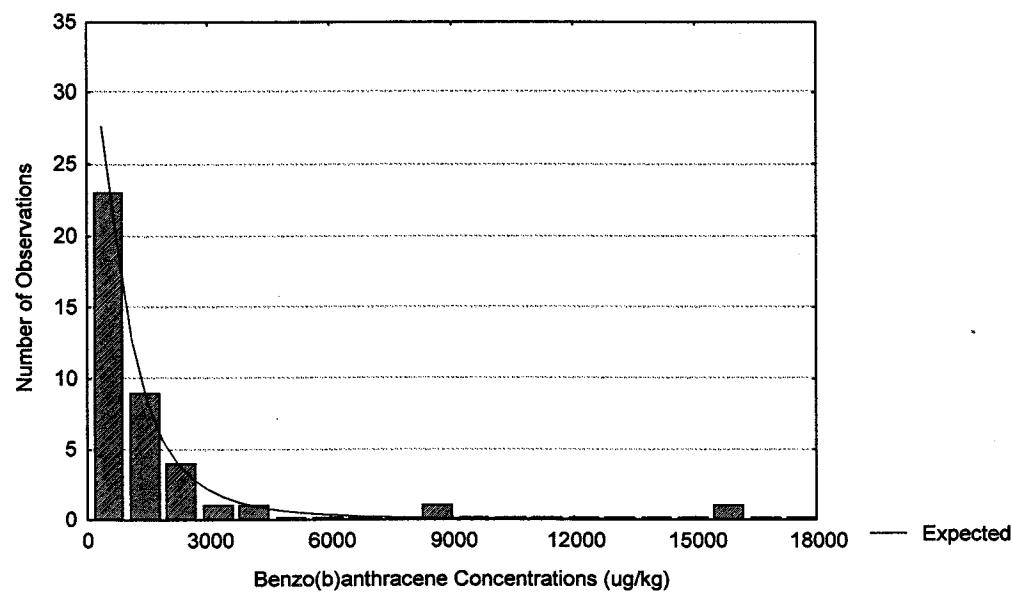
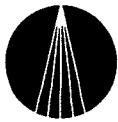


Figure 4
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 5
Fit-Test Distribution Histogram: Assumed Normal

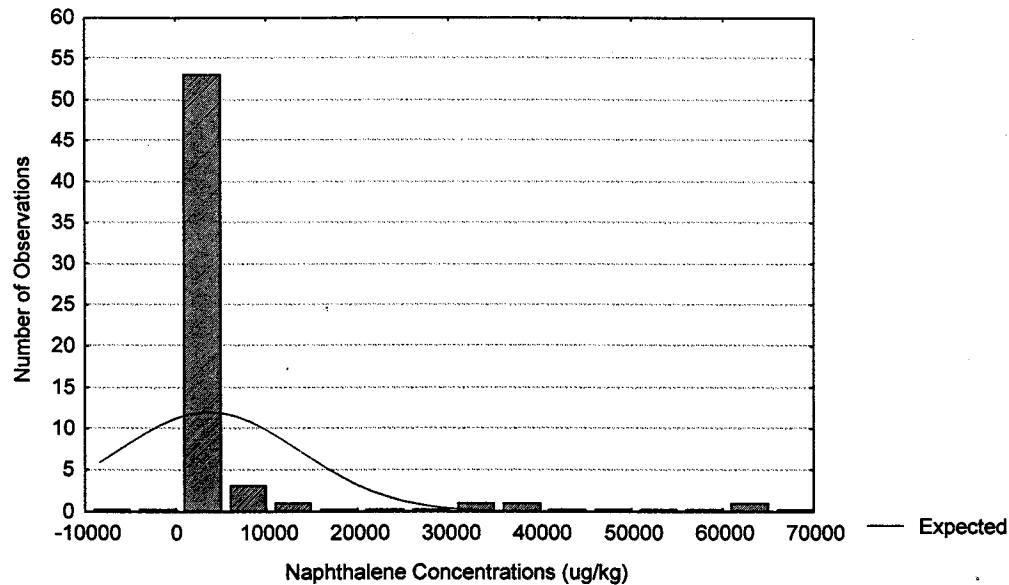
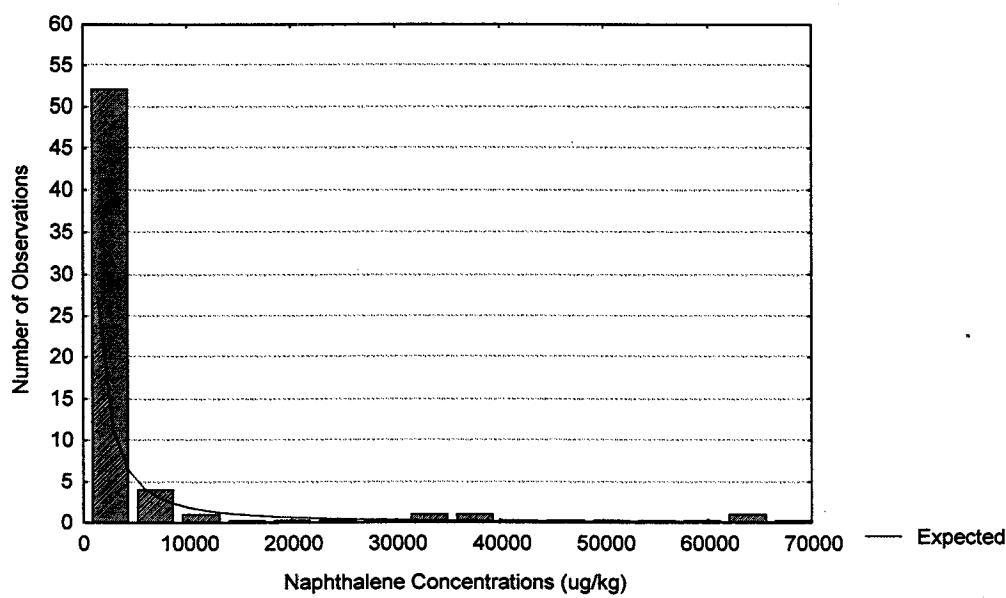
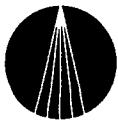


Figure 6
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 7
Fit-Test Distribution Histogram: Assumed Normal

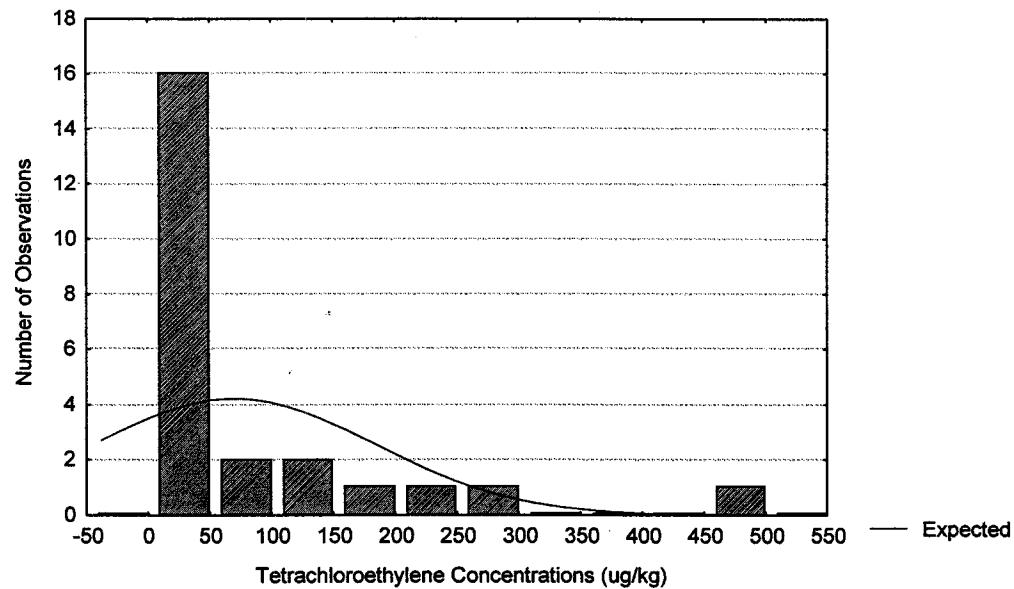
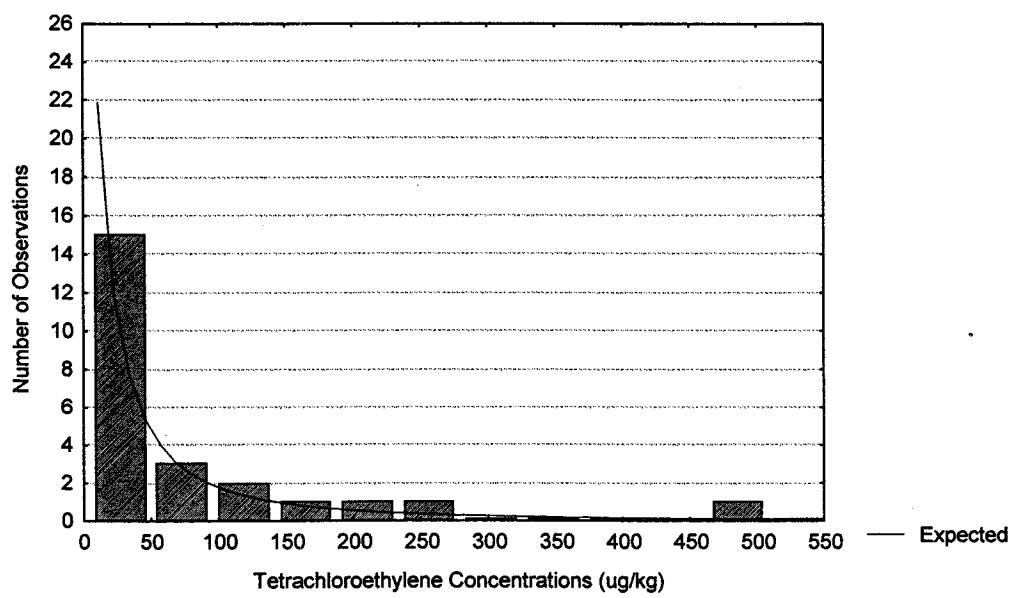
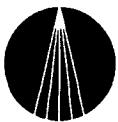


Figure 8
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 9
Fit-Test Distribution Histogram: Assumed Normal

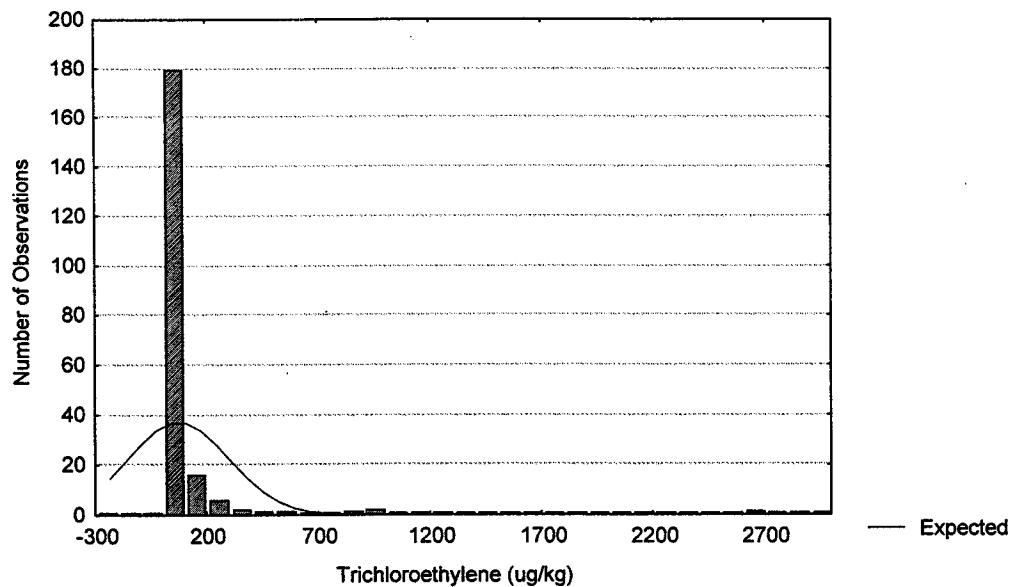
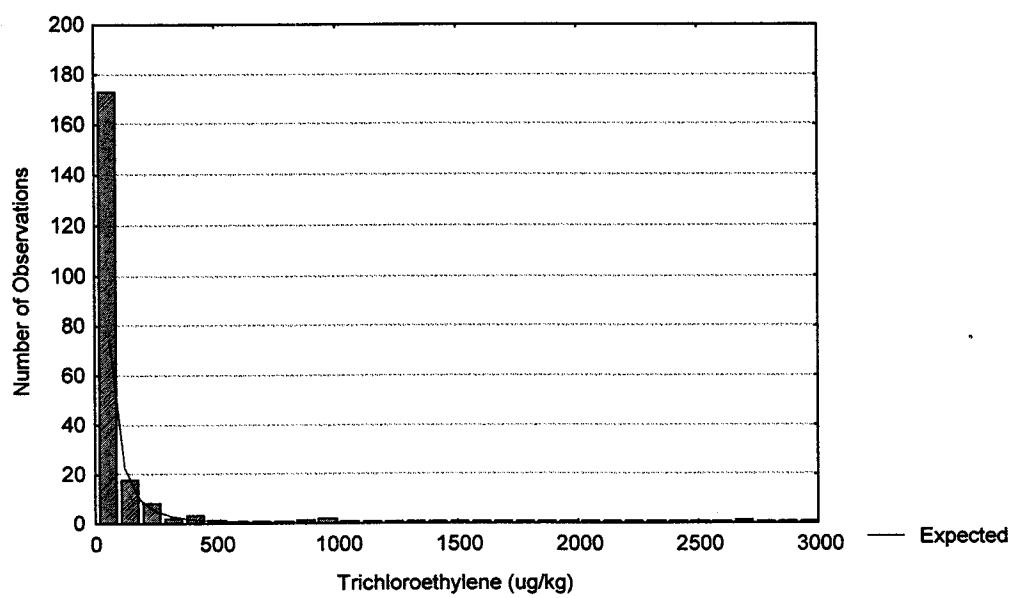
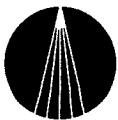


Figure 10
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 11
Fit-Test Distribution Histogram: Assumed Normal

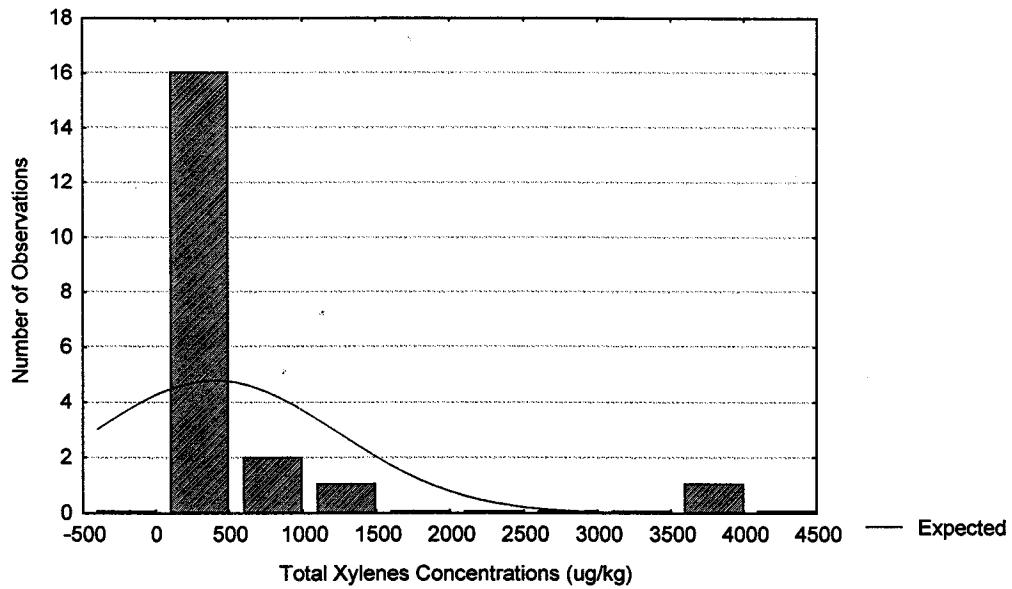
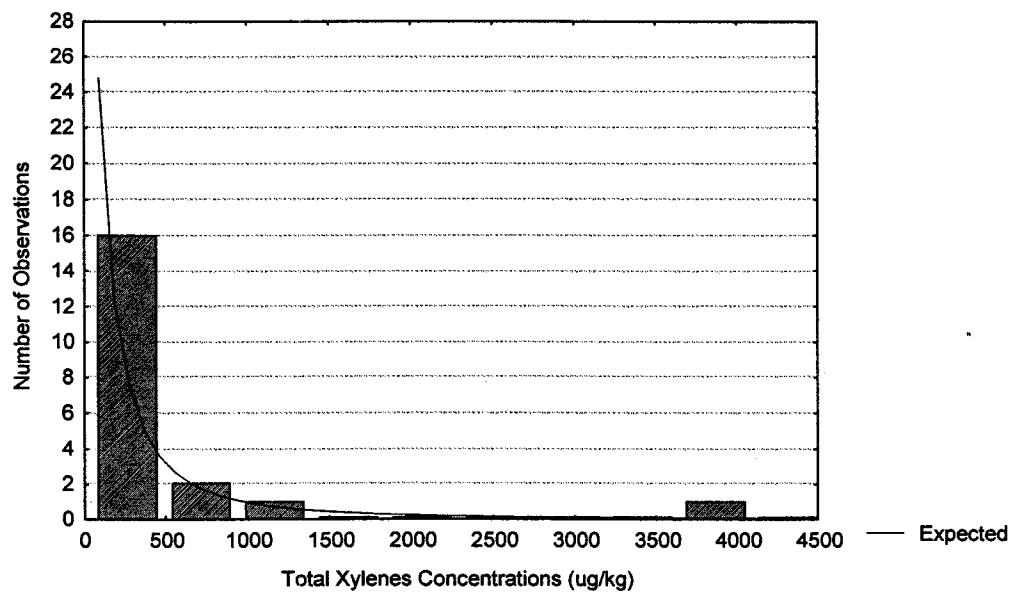
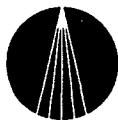


Figure 12
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

Figure 13
Fit-Test Distribution Histogram: Assumed Normal

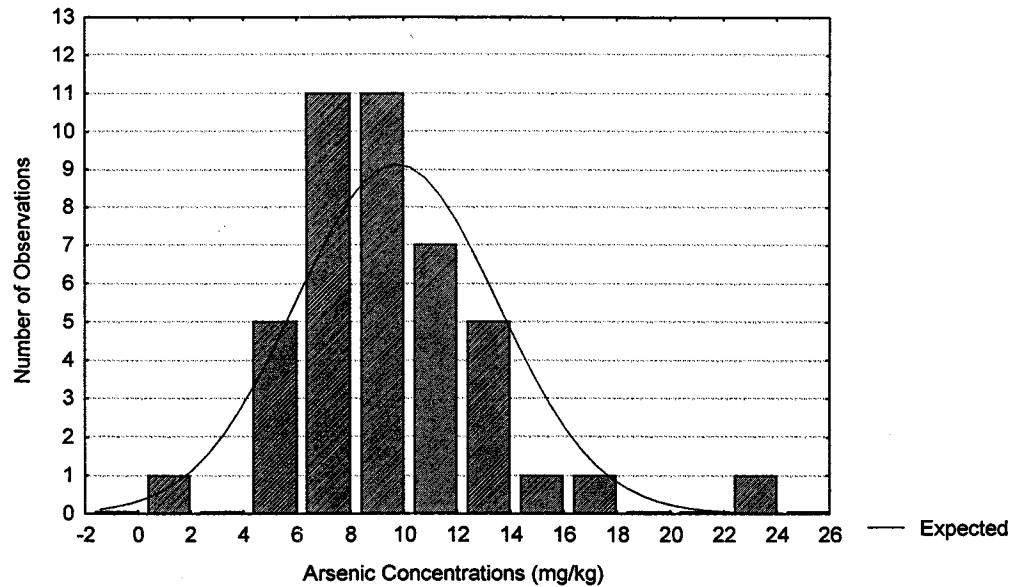
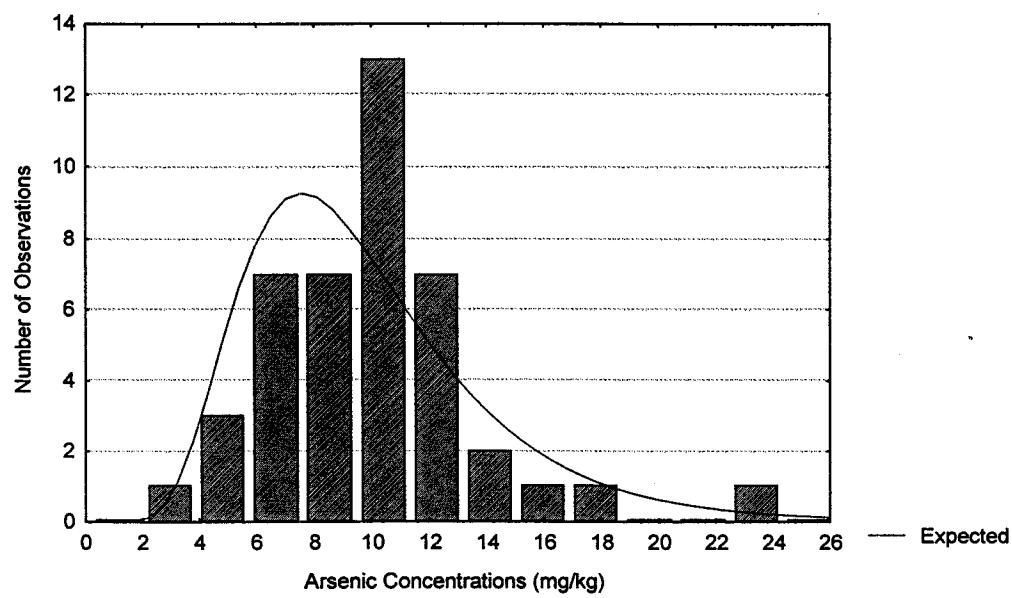
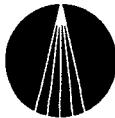


Figure 14
Fit-Test Distribution Histogram: Assumed Lognormal





James Ross
March 20, 1998

b) the D'Agostino's test results to show either the normal or log-normal distribution.

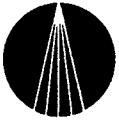
The D'Agostino's test results were inconclusive and were supplemented with distribution histograms for the determination of data distributions. As noted in DTSC HERD's final policy titled *Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities* (Cal/EPA 1997), "distributions will generally fail tests for both normality and lognormality if they contain either multiple populations or a high proportion of non-detects." As presented in Table 2-1 of the PDRA, no organic constituents were detected in more than 16 percent of the samples. Thus the majority (>84 percent) of the samples analyzed for organic constituents were non-detects. This localized distribution of organics, with large areas of non-detects is indicative of a lognormal distribution and limited releases to the environmental media. This is consistent with the distribution used in the quantification of risk in the PDRA.

Comment 2: Please use site-specific soil physical data (soil bulk density = 1.87 g/cm³, water filled porosity = 0.37(-), and air filled porosity 0.06 (-)) to recalculate equations (5-1), (5-5), (5-11) and (5-12) for COPC tetrachloroethylene (K_{oc} = 660 mL/g and $H=0.957(-)$), and tabulate the results in comparison with the current results in the report.

Response: As presented in the subject document and communications between Integrated and RWQCB staff, DTSC-HERD default soil parameters were used to conservatively estimate the rate of emissions from the site soils. Based on the use of these more conservative parameters, this approach ensures that the emissions estimated for the site are not underestimated. The following table has been assembled for the requested comparison with the resultant conservative value highlighted in green:

Equation of Interest	Site-Specific Soil Parameters	PDRA Soil Parameters
(5-1) - Volatilization Factor (m ³ /kg)	1.06E+04	3.02E+02
(5-5) - Soil-to-Air Partitioning Coefficient (g/cm ³)	3.60E-01	6.57E-01
(5-11) - Soil Gas Concentration (mg/L)	4.14E-06	7.51E-06
(5-12) - Vapor Flux (mg/cm ² -sec)	2.32E-12	7.32E-10

As shown in the comparison table, the values used in the PDRA are significantly more conservative than the site-specific data for the estimation of emissions. As mentioned in communications with Water Board staff, the most sensitive equations to the parameters identified by the RWQCB are 5-4 and 5-13, the calculation of the chemical-specific effective diffusivity (Dei). The Dei estimated in the PDRA represents a two orders of magnitude higher estimated diffusion rate through the soils.



James Ross
March 20, 1998

I appreciate the opportunity to work closely with you and your staff on this important project. Should you or your staff have any further questions concerning the Post-Demolition Risk Assessment, please feel free to call me directly at (714) 852-9050, extension 20.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Stoker".

Chris Stoker
Program Manager

CC: S. Mario Stavale, Boeing



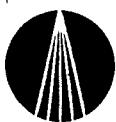
- Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual, Part A (EPA 1989a)
- Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 1 (EPA 1989b)
- Statistical Methods for Environmental Pollution Monitoring (Gilbert 1987)
- Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities (EPA 1989c)

For each soil COPC, statistical summaries were developed, including the arithmetic mean, standard error of the arithmetic mean, minimum measured concentration, maximum measured concentration, frequency of detection, D'Agostino's test and histograms for distribution, fit testing, and 95 percent upper confidence limit (UCL) of the mean (see Appendices C and D). The applicability of D'Agostino's test and the 95 percent UCL of the mean is discussed below. First, however, an approach for the assignment of values for non-detected results is addressed.

5.2.1 Treatment of Non-Detected Constituents

Every analytical technique used to measure the concentration of constituents has an associated limit of detection (LOD) and limit of quantification (LOQ). A constituent that was not detected in a sample is below the LOD. A constituent that was detected but in such low amounts that its concentration could not be accurately determined is below the LOQ. When a constituent is reported as not detected in a sample, the actual concentration is any value up to the LOD.

For this post-demolition risk assessment, when a constituent was found in some of the samples and was not clearly spatially limited, it is assumed to exist in samples in which it was not detected. The assignment of a value of one-half the detection limit (if the constituent is normally distributed), or the detection limit divided by the square root of 2 (if the constituent is lognormally distributed), or the LOD to all samples reported as not detected reflects the assumption that the samples are equally likely to have any value up to the detection limit. Furthermore, when the sample values above the LOQ are lognormally distributed, it is.



reasonable to assume that values below the LOQ are also lognormally distributed, and the reported detection limit divided by the square root of 2 should be assigned as a proxy value (Cal/EPA 1992, EPA 1988a, 1988b).

5.2.2 Determination of Data Distribution

The data set distribution must be determined prior to the application of any statistical methods. This minimizes the effect of data biasing. D'Agostino's test (Gilbert 1987) is an effective method for testing whether a data set has been drawn from an underlying normal distribution (see Appendix D). Conducting the test on the logarithms of the data is an equally effective way of evaluating the hypothesis of a lognormal distribution. Distribution histograms were developed when D'Agostino's test was found to be inconclusive. The data sets for the post-demolition risk assessment were found to best fit the lognormal distribution and were statistically evaluated in this manner.

5.2.3 Use of 95 Percent Upper Confidence Limit Concentrations

Due to the uncertainty associated with characterizing potentially heterogeneous media, the 95 percent UCL for either a normal or lognormal distribution must be used to represent constituent concentrations (Cal/EPA 1992, EPA 1988a, 1988b). As previously mentioned, the Parcel A data were determined to be lognormally distributed. Thus, the upper 95 percent UCL for lognormal distribution was used for soil source-term concentrations (see Appendix D).

Tables 5-1 and 5-2 summarize the 95 percent UCL concentrations for the soil COPCs by AOPC as calculated for direct exposures (0 to 12 feet bgs) and long-term fate and transport modeling (0 to 50 feet bgs). It is important to note that when the 95 percent UCL exceeded the maximum detected value, the maximum detected value was used. This approach is consistent with DTSC guidance (Cal/EPA 1994).

The values presented in Tables 5-1 and 5-2 are used throughout the post-demolition risk assessment.



$$D_{ei} = D_i \times (P_a^{3.33}/P_t^2) \quad (5-4)$$

where

- D_i = COPC-specific diffusivity of COPC in air (cm^2/sec), from Table 5-3
 P_a = air filled porosity of soil matrix, 0.284 (unitless) (Cal/EPA 1994)
 P_t = total porosity of soil matrix, 0.434 (unitless) (Cal/EPA 1994)

The soil-to-air partition coefficient, K_{as} , was derived from the COPC-specific soil-water partition coefficient and Henry's Law constant:

$$\underline{\underline{K_{as} = H'/(R \times T \times K_d)}} \quad (5-5)$$

where

- H' = COPC-specific Henry's Law constant ($\text{atm}\cdot\text{m}^3/\text{mol}$), from Table 5-3
 R = ideal gas constant, $8.206 \times 10^{-5} \text{ atm}\cdot\text{m}^3/\text{mol}\cdot\text{K}$
 T = temperature in Kelvin, 293 K
 K_d = soil-to-water partitioning coefficient (cm^3/g), K_{oc} from Table 5-3 times the fraction of organic carbon (foc), 0.004 (unitless)

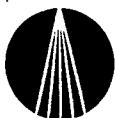
The intermediate conversion factor, Z , in the volatilization attenuation factor was calculated as:

$$Z = (D_{ei} \times P_a) / [P_a + (ps \times (1 - P_a) / K_{as})] \quad (5-6)$$

where

- D_{ei} = effective diffusivity of a COPC through a soil matrix (cm^2/sec)
 P_a = air filled porosity of the soil matrix, 0.284 (unitless) (Cal/EPA 1994)
 ps = true soil or particle density, 1.5 g/cm^3 (Cal/EPA 1994)
 K_{as} = soil-to-air partition coefficient ($\text{g soil}/\text{cm}^3 \text{ air}$)

A summary of the calculated volatilization attenuation factors is presented in Table 5-4.



maximum off-site impact for each COPC. Additional discrete receptor points have been located along the northern boundary of the residential development to the south of the Boeing property. These receptors have been used to estimate maximum off-site residential exposure concentrations. The flagpole receptor option in the ISCST3 model was used to place the grid points 1.5 meters above the ground—the approximate breathing height of a typical adult.

TABLE 5-5
COPC FLUX RATES BY SOURCE (mg/cm² sec)

COPC	AOPC 1	AOPC 2
1,1-dichloroethene	<u>3.51</u> E-11	<u>8.75</u> E-11
1,2,4-trimethylbenzene	<u>3.68</u> E-14	<u>1.83</u> E-13
1,3,5-trimethylbenzene	<u>1.07</u> E-13	<u>3.18</u> E-13
aroclor 1248	NV	NV
<u>aroclor 1254</u>	<u>NV</u>	<u>NV</u>
aroclor 1260	NV	NV
<u>arsenic</u>	<u>NV</u>	<u>NV</u>
benzo(a)anthracene	NV	NV
benzo(a)pyrene	NV	NV
benzo(b)fluoranthene	NV	NV
<u>benzo(k)fluoranthene</u>	<u>NV</u>	<u>NV</u>
bis(2-ethylhexyl)phthalate	NV	NV
chrysene	NV	NV
dibenzo(a,h)anthracene	NV	NV
fluoranthene	NV	NV
<u>indeno(1,2,3-cd)pyrene</u>	<u>NV</u>	<u>NV</u>
naphthalene	NV	NV
n-butylbenzene	<u>4.77</u> E-14	<u>9.70</u> E-14
n-propylbenzene	<u>1.36</u> E-13	<u>3.12</u> E-13
p-cymene	<u>8.24</u> E-15	<u>1.80</u> E-14
phenanthrene	NV	NV
pyrene	NV	NV
tetrachloroethylene	<u>7.32</u> E-13	<u>1.06</u> E-12
trichloroethene	<u>8.74</u> E-13	<u>3.35</u> E-12
xylenes	<u>9.11</u> E-14	<u>1.91</u> E-13

NV = Not Volatile



Air Dispersion Modeling Results

The ISCST3 results for the maximum on- and off-site COPC, concentrations in air are summarized in Table 5-6. The modeling output files are provided in Appendix A.

TABLE 5-6
MODELED MAXIMUM ON-SITE AND OFF-SITE
COPC CONCENTRATIONS IN AIR (mg/m³)

COPC	Maximum On-Site Concentration	Maximum Off-Site Concentration	Maximum Residential Concentration
1,1-dichloroethene	<u>1.24E-05</u>	<u>6.57E-06</u>	<u>3.65E-08</u>
1,2,4-trimethylbenzene	<u>2.38E-08</u>	<u>7.04E-09</u>	<u>3.83E-11</u>
1,3,5-trimethylbenzene	<u>4.37E-08</u>	<u>2.01E-08</u>	<u>1.11E-10</u>
aroclor 1248	NV	NV	NV
<u>aroclor 1254</u>	<u>NV</u>	<u>NV</u>	<u>NV</u>
aroclor 1260	NV	NV	NV
<u>arsenic</u>	<u>NV</u>	<u>NV</u>	<u>NV</u>
benzo(a)anthracene	NV	NV	NV
benzo(a)pyrene	NV	NV	NV
benzo(b)fluoranthene	NV	NV	NV
<u>benzo(k)fluoranthene</u>	<u>NV</u>	<u>NV</u>	<u>NV</u>
bis(2-ethylhexyl)phthalate	NV	NV	NV
chrysene	NV	NV	NV
dibenzo(a,h)anthracene	NV	NV	NV
fluoranthene	NV	NV	NV
<u>indeno(1,2,3-cd)pyrene</u>	<u>NV</u>	<u>NV</u>	<u>NV</u>
naphthalene	NV	NV	NV
n-butylbenzene	<u>1.43E-08</u>	<u>8.90E-09</u>	<u>4.96E-11</u>
n-propylbenzene	<u>4.48E-08</u>	<u>2.54E-08</u>	<u>1.41E-10</u>
p-cymene	<u>2.61E-09</u>	<u>1.54E-09</u>	<u>8.57E-12</u>
phenanthrene	NV	NV	NV
pyrene	NV	NV	NV
tetrachloroethylene	<u>1.70E-07</u>	<u>1.36E-07</u>	<u>7.61E-10</u>
trichloroethene	<u>4.46E-07</u>	<u>1.66E-07</u>	<u>9.09E-10</u>
xylenes	<u>2.79E-08</u>	<u>1.70E-08</u>	<u>9.47E-11</u>

NV = Not Volatile



The exposure pathways of concern for the construction worker are: 1) inhalation of VOCs and particulate, 2) incidental ingestion of soil, and 3) dermal contact with soil. The example calculation methodology applies to all receptors associated with the Parcel A exposure scenarios; however, appropriate exposure parameters for other receptors would be substituted where applicable.

6.1.1 Air Exposures - Inhalation

Equation 6-16 from RAGS (EPA 1989a) was used to quantify intake from the inhalation pathway:

$$I_a = (C_a)(IR)(ET)(EF)(ED) / (BW)(AT) \quad (6-1)$$

where

- I_a = intake from inhalation of a COPC in air (mg/kg-d)
 C_a = concentration of COPC in air (mg/m³)
IR = inhalation rate (m³/h)
ET = exposure time (h/d)
EF = exposure frequency (d/y)
ED = exposure duration (y)
BW = body weight (kg)
AT = averaging time (d), ED x 365d/y (noncarcinogens), 70y x 365d/y (carcinogens)

The COPC concentration in air, C_a , was calculated separately for the construction and commercial/industrial emissions cases, as follows:

Construction Emissions Case

$$C_a = (C_s)(I/VF + I/PF) \quad (6-2)$$

- C_s = concentration of COPC in soil (mg/kg), from Table 5-1
VF = volatilization factor (m³/kg), from Table 5-4



PF = particulate attenuation factor, $4.77 \times 10^9 \text{ m}^3/\text{kg}$

Commercial/Industrial Emissions Case

$$C_a = C_i + C_o \quad (6-3)$$

C_i = modeled indoor air concentration (mg/m^3), from Table 5-7

C_o = maximum modeled on-site COPC concentration (mg/m^3), from Table 5-6

As mentioned, the on-site construction worker's exposure to benzene is used as an example. The construction worker's intake (I_a) resulting from inhaling air hypothetically containing 1 milligram benzene per cubic meter air (C_a) is calculated as follows (see Table 6-1 for exposure parameters and sources). The inhalation rate (IR) for an active adult is 2.5 cubic meters per hour. The total exposure time (ET) is 8 hours per day for on-site exposures. The exposure duration (ED) is 1 year, and the exposure frequency (EF) is 250 days per year. The body weight (BW) for the adult resident is 70 kilograms. Since benzene is a carcinogen, the exposure is averaged over a 70-year lifetime (AT = 25,550 d). The exposure would be averaged over the period of exposure for all noncarcinogenic exposures (AT = ED x 365). Substituting these values into Equation 6-1 yields:

$$I_a = (1.0 \text{ mg/m}^3)(2.5 \text{ m}^3/\text{h})(8 \text{ h/d})(250 \text{ d/y})(1 \text{ y}) / (70\text{kg})(25550 \text{ d}) \quad (6-4)$$

or

$$I_a = 2.80 \times 10^{-3} \text{ mg/kg-d}$$

Appendix B presents the complete calculation sheets for inhalation exposures.

1.1.1 Soil Exposures - Incidental Ingestion

Equation 6-14 from RAGS (EPA 1989a) was used to quantify intake from the ingestion pathway:



6.3 RISKS POSED BY THE POST-DEMOLITION EXPOSURE SCENARIOS

Table 6-3 presents the total HI and total ILCR results for each AOPC and receptor studied under the Parcel A post-demolition exposure scenarios. Because the reasonable maximum exposure (RME) approach was used to quantify potential health impacts, it should be noted that if the estimated health effects of the RME are within acceptable limits, then it is likely that all other, lesser exposures related to Parcel A are also within these limits. See Section 4.1.3 for more information on RME.

Each entry in the Table 6-3 is supported by detailed calculations of health effects by receptor, COPC, and pathway (see Appendix B).

TABLE 6-3
SUMMARY OF POST-DEMOLITION HEALTH RISK,
C-6 FACILITY, PARCEL A

On-Site Receptors	HI	ILCR
AOPC 1		
Construction Worker	5.1E-02	1.4E-06
Commercial/Industrial Worker, RME ^a	6.4E-05	1.2E-10
Commercial/Industrial Worker, Upper Bound ^b	4.6E-03	4.4E-06
AOPC 2		
Construction Worker	1.5E-02	7.7E-07
Commercial/Industrial Worker, RME ^a	8.7E-05	1.7E-10
Commercial/Industrial Worker, Upper Bound ^b	1.0E-03	2.5E-06
Off-Site Receptors	HI	ILCR
Commercial/Industrial Worker	2.5E-05	5.2E-11
Resident Adult	1.2E-06	2.9E-12
Resident Child	5.5E-06	2.7E-12

NOTES:

^aReasonable Maximum Exposure conditions, assumes 2-foot layer of clean fill.

^bUpper Bound exposure conditions, assumes no layer of fill.

AOPC = Area of Potential Concern

HI = Hazard Index

ILCR = Incremental Lifetime Cancer Risk



TABLE 8-1
SUMMARY OF POST-DEMOLITION HEALTH RISK,
C-6 FACILITY, PARCEL A

On-Site Receptors	HI	ILCR
AOPC 1		
Construction Worker	5.1E-02	1.4E-06
Commercial/Industrial Worker, RME ^a	6.4E-05	1.2E-10
Commercial/Industrial Worker, Upper Bound ^b	4.6E-03	4.4E-06
AOPC 2		
Construction Worker	1.5E-02	7.7E-07
Commercial/Industrial Worker, RME ^a	8.7E-05	1.7E-10
Commercial/Industrial Worker, Upper Bound ^b	1.0E-03	2.5E-06
Off-Site Receptors	HI	ILCR
Commercial/Industrial Worker	2.5E-05	5.2E-11
Resident Adult	1.2E-06	2.9E-12
Resident Child	5.5E-06	2.7E-12

^aReasonable Maximum Exposure conditions, assumes 2-foot layer of clean fill.

^bUpper Bound exposure conditions, assumes no layer of fill.

AOPC = Area of Potential Concern

HI = Hazard Index

ILCR = Incremental Lifetime Cancer Risk

Table B-1
Summary of Potential Health Effects
On-Site Construction Worker AOPC 1

<u>Exposure Pathway</u>	<u>Receptor Hazard Quotient</u>
Inhalation of Particulates and Volatiles	3.5E-03
Incidental ingestion of soils	3.1E-02
Dermal contact with soils	1.7E-02
Total Population Hazard Quotient =	5.1E-02

<u>Exposure Pathway</u>	<u>Receptor Incremental Lifetime Cancer Risk</u>
Inhalation of Particulates and Volatiles	8.1E-10
Incidental ingestion of soils	6.0E-07
Dermal contact with soils	8.2E-07
Total Population Incremental Lifetime Cancer Risk =	1.4E-06

Table B-2
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 1
Via Incidental Ingestion of Soils

$$\text{Intake Equation} = \frac{\text{CS} \times \text{EF} \times \text{ED} \times \text{CF} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	250 d/year
EDn	Exposure duration for non-carcinogens	1 year
EDc	Exposure duration for carcinogens	1 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	365 day
CS	Concentration of chemicals in soil (see Table 5-1)	

Chemical Concentrations

Compound	Concentration	Compound	Concentration
1,1-dichloroethene	2.57E-03	naphthalene	2.05E-01
1,2,4-trimethylbenzene	3.82E-03	n-butylbenzene	2.81E-03
1,3,5-trimethylbenzene	2.96E-03	n-propylbenzene	2.57E-03
aroclor 1248	3.69E-02	p-cymene	2.47E-03
aroclor 1254	3.28E-02	phenanthrene	2.03E-01
aroclor 1260	2.08E-02	pyrene	3.12E-01
arsenic	1.56E+00	tetrachloroethylene	2.69E-03
benzo(a)anthracene	2.43E-01	trichloroethylene	2.63E-03
benzo(a)pyrene	3.39E-01	xylenes	2.34E-03
benzo(b)fluoranthene	3.91E-01		
benzo(k)fluoranthene	3.06E-01		
bis(2-ethylhexyl)phthalate	2.58E-01		
chrysene	2.86E-01		
dibenz(a,h)anthracene	1.36E-01		
fluoranthene	2.66E-01		
indeno(1,2,3-cd)pyrene	3.33E-01		

Table B-2 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 1
Via Incidental Ingestion of Soils

Non-Carcinogenic Calculation						Carcinogenic Calculation		
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	Compound	CDI (mg/kg-d)	CSF (mg/kg-d) ₋₁	ILCR (unitless)	
1,1-dichloroethene	1.21E-08	9.00E-03	1.34E-06	1,1-dichloroethene	1.72E-10	NA	NA	
1,2,4-trimethylbenzene	1.79E-08	5.00E-01	3.59E-08	1,2,4-trimethylbenzene	2.56E-10	NA	NA	
1,3,5-trimethylbenzene	1.39E-08	5.00E-01	2.78E-08	1,3,5-trimethylbenzene	1.99E-10	NA	NA	
aroclor 1248	1.73E-07	7.00E-05	2.48E-03	aroclor 1248	2.48E-09	7.70E-00	1.91E-08	
aroclor 1254	1.54E-07	7.00E-05	2.20E-03	aroclor 1254	2.20E-09	7.70E-00	1.69E-08	
aroclor 1260	9.77E-08	7.00E-05	1.40E-03	aroclor 1260	1.40E-09	7.70E-00	1.07E-08	
arsenic	7.33E-06	3.00E-04	2.44E-02	arsenic	1.05E-07	1.50E-00	1.57E-07	
benzo(a)anthracene	1.14E-06	4.00E-02	2.85E-05	benzo(a)anthracene	1.63E-08	1.15E-00	1.87E-08	
benzo(a)pyrene	1.59E-06	4.00E-02	3.98E-05	benzo(a)pyrene	2.27E-08	1.15E-01	2.62E-07	
benzo(b)fluoranthene	1.84E-06	4.00E-02	4.59E-05	benzo(b)fluoranthene	2.62E-08	1.15E-00	3.02E-08	
benzo(k)fluoranthene	1.44E-06	4.00E-02	3.59E-05	benzo(k)fluoranthene	2.05E-08	1.15E-00	2.36E-08	
bis(2-ethylhexyl)phthalate	1.21E-06	2.00E-02	6.06E-05	bis(2-ethylhexyl)phthalate	1.73E-08	8.40E-03	1.45E-10	
chrysene	1.34E-06	4.00E-02	3.36E-05	chrysene	1.92E-08	1.15E-01	2.21E-09	
dibenz(a,h)anthracene	6.39E-07	4.00E-02	1.60E-05	dibenz(a,h)anthracene	9.12E-09	4.10E-00	3.74E-08	
fluoranthene	1.25E-06	4.00E-01	3.12E-06	fluoranthene	1.78E-08	NA	NA	
indeno(1,2,3-cd)pyrene	1.56E-06	4.00E-02	3.91E-05	indeno(1,2,3-cd)pyrene	2.23E-08	1.15E+00	2.57E-08	
naphthalene	9.63E-07	4.00E-02	2.41E-05	naphthalene	1.38E-08	NA	NA	
n-butylbenzene	1.32E-08	1.00E-01	1.32E-07	n-butylbenzene	1.89E-10	NA	NA	
n-propylbenzene	1.21E-08	1.00E-01	1.21E-07	n-propylbenzene	1.72E-10	NA	NA	
p-cymene	1.16E-08	1.00E-01	1.16E-07	p-cymene	1.66E-10	NA	NA	
phenanthrene	9.53E-07	3.00E-01	3.18E-06	phenanthrene	1.36E-08	NA	NA	
pyrene	1.47E-06	3.00E-01	4.88E-06	pyrene	2.09E-08	NA	NA	
tetrachloroethene	1.26E-08	1.00E-01	1.26E-07	tetrachloroethene	1.80E-10	5.10E-02	9.20E-12	
trichloroethene	1.24E-08	7.35E-03	1.68E-06	trichloroethene	1.76E-10	1.50E-02	2.65E-12	
xylenes	1.10E-08	2.00E+00	5.50E-09	xylenes	1.57E-10	NA	NA	

Table B-3
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 1
Via Dermal Contact with Soils

$$\text{Intake Equation} = \text{CS} \times \text{CE} \times \text{EF} \times \text{ED} \times \text{AF} \times \text{ABS} \times \text{SA} \\ \text{BW} \times \text{AT}$$

SA	Surface area of exposed skin (50th percentile, hands only)
AF	Adherence Factor
ABS	Absorption Factor (see table below)
CF	Conversion factor
EF	Exposure frequency
EDn	Exposure duration for non-carcinogens
EDc	Exposure duration for carcinogens
BW	Body weight
ATc	Average time for carcinogens (lifetime)
ATn	Average time for non-carcinogens (EDn x 365)
CS	Concentration of chemicals in soil (see Table 5-1)

Chemical Concentrations

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
1,1-dichloroethene	1.00E-01	2.57E-03	naphthalene	1.50E-01	2.05E-01
1,2,4-trimethylbenzene	1.00E-01	3.82E-03	n-butylbenzene	1.00E-01	2.81E-03
1,3,5-trimethylbenzene	1.00E-01	2.96E-03	n-propylbenzene	1.00E-01	2.57E-03
aroclor 1248	1.00E-01	3.69E-02	p-cymene	1.00E-01	2.47E-03
aroclor 1254	1.00E-01	3.28E-02	phenanthrene	1.50E-01	2.03E-03
aroclor 1260	1.00E-01	2.08E-02	Pyrene	1.50E-01	3.12E-01
arsenic	3.00E-02	1.56E+00	tetrachloroethylene		
benzo(a)anthracene	1.50E-01	2.43E-01	trifluoroethylene		
benzo(a)pyrene	1.50E-01	3.39E-01	xylenes	1.00E-01	2.63E-03
benzo(b)fluoranthene	1.50E-01	3.91E-01			
benzo(k)fluoranthene	1.50E-01	3.06E-01			
bis(2-ethylhexyl)phthalate	1.00E-01	2.58E-01			
chrysene	1.50E-01	2.86E-01			
dibenz(a,h)anthracene	1.50E-01	1.36E-01			
fluoranthene	1.00E-01	2.66E-01			
indeno(1,2,3-cd)pyrene	1.00E-01	3.33E-01			

Table B-3 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker A OPC 1
Via Dermal Contact with Soils

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)
1,1-dichloroethene	1.46E-08	9.00E-03	1.62E-06
1,2,4-trimethylbenzene	2.17E-08	5.00E-01	4.34E-08
1,3,5-trimethylbenzene	1.68E-08	5.00E-01	3.36E-08
aroclor 1248	2.09E-07	7.00E-05	2.99E-03
aroclor 1254	1.86E-07	7.00E-05	2.66E-03
aroclor 1260	1.18E-07	7.00E-05	1.69E-03
arsenic	2.66E-06	3.00E-04	8.85E-03
benzo(a)anthracene	2.07E-06	4.00E-02	5.17E-05
benzo(a)pyrene	2.89E-06	4.00E-02	7.21E-05
benzo(b)fluoranthene	3.33E-06	4.00E-02	8.32E-05
benzo(k)fluoranthene	2.60E-06	4.00E-02	6.51E-05
bis(2-ethylhexyl)phthalate	1.46E-06	2.00E-02	7.32E-05
chrysene	2.43E-06	4.00E-02	6.09E-05
dibenz(a,h)anthracene	1.16E-06	4.00E-02	2.89E-05
fluoranthene	1.51E-06	4.00E-01	3.77E-06
indeno[1,2,3-cd]pyrene	1.89E-06	4.00E-02	4.72E-05
naphthalene	1.75E-06	4.00E-02	4.36E-05
n-butylbenzene	1.59E-08	1.00E-01	1.59E-07
n-propylbenzene	1.46E-08	1.00E-01	1.46E-07
p-cymene	1.40E-08	1.00E-01	1.40E-07
phenanthrene	1.73E-06	3.00E-01	5.76E-06
pyrene	2.66E-06	3.00E-01	8.85E-06
tetrachloroethylene	1.53E-08	1.00E-01	1.53E-07
trichloroethylene	1.49E-08	7.35E-03	2.03E-06
xylenes	1.33E-08	2.00E-00	6.64E-09
HQ Summation =			1.7E-02

ILCR Summation =

8.2E-07

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d) ⁻¹	ILCR (unitless)
1,1-dichloroethene	1.1E-10	NA	NA
1,2,4-trimethylbenzene	3.10E-10	NA	NA
1,3,5-trimethylbenzene	2.40E-10	NA	NA
aroclor 1248	2.99E-09	7.70E+00	2.30E-08
aroclor 1254	2.66E-09	7.70E+00	2.05E-08
aroclor 1260	1.69E-09	7.70E+00	1.30E-08
arsenic	3.79E-08	1.50E+00	5.69E-08
benzo(a)anthracene	2.96E-08	1.15E+00	3.40E-08
benzo(a)pyrene	4.12E-08	1.15E+01	4.74E-07
benzo(b)fluoranthene	4.75E-08	1.15E+00	5.47E-08
benzo(k)fluoranthene	3.72E-08	1.15E+00	4.28E-08
bis(2-ethylhexyl)phthalate	2.09E-08	8.40E-03	1.76E-10
chrysene	3.48E-08	1.15E-01	4.00E-09
dibenz(a,h)anthracene	1.65E-08	4.10E+00	6.78E-08
fluoranthene	2.16E-08	NA	NA
indeno[1,2,3-cd]pyrene	2.70E-08	1.15E+00	3.10E-08
naphthalene	2.49E-08	NA	NA
n-butylbenzene	2.28E-10	NA	NA
n-propylbenzene	2.08E-10	NA	NA
p-cymene	2.00E-10	NA	NA
phenanthrene	2.47E-08	NA	NA
pyrene	2.79E-08	NA	NA
tetrachloroethylene	2.18E-10	5.10E-02	1.11E-11
trichloroethylene	2.13E-10	1.50E-02	3.20E-12
xylenes	1.90E-10	NA	NA
ILCR Summation =			8.2E-07

Table B-4
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 1
Via Inhalation of Particulates and Volatiles

Intake Equation	=	CS X ((I/VF + I/PEF) X EF X ED X ET X IR EW X AT)					
IR	Inhalation rate of gases (RAGS, 1989)	2.5 ms/h					
EF	Exposure frequency	250 days/year					
EDn	Exposure duration for non-carcinogens	1 year					
EDc	Exposure duration for carcinogens	1 year					
BW	Body weight	70 kg					
ATc	Average time for carcinogens (lifetime)	25550 days					
ATn	Average time for non-carcinogens (EDn x 365)	365 days					
ET	Exposure time outdoors	8 h/d					
CS	Concentration of chemicals in soil	(see Table 5-1)					
VF	Volatilization Factor	(see Table 5-4)					
PEF	Particulate Emission Factor	(see Section 5.3.1.2)					
Chemical Concentrations							
Compound	VF (m³/kg)	PEF (m³/kg)	CS (mg/kg)	Compound	VF (m³/kg)	PEF (m³/kg)	CS (mg/kg)
1,1-dichloroethene	2.07E+01	NA	2.57E-03	naphthalene	NA	4.77E+09	2.05E-01
1,2,4-trimethylbenzene	1.79E+03	NA	3.82E-03	n-butylbenzene	1.26E+03	NA	2.81E-03
1,3,5-trimethylbenzene	8.99E+02	NA	2.96E-03	n-propylbenzene	7.29E+02	NA	2.57E-03
aroclor 1248	NA	4.77E+09	3.69E-02	p-cymene	2.94E+03	NA	2.47E-03
aroclor 1254	NA	4.77E+09	3.28E-02	phenanthrene	NA	4.77E+09	2.03E-01
aroclor 1260	NA	4.77E+09	2.08E-02	pyrene	NA	4.77E+09	3.12E-01
arsenic	NA	4.77E+09	1.56E+00	tetrachloroethene	3.0E+02	NA	2.69E-03
benzo(a)anthracene	NA	4.77E+09	2.43E-01	trichloroethene	2.72E+02	NA	2.63E-03
benzo(a)pyrene	NA	4.77E+09	3.39E-01	xylenes	8.50E+02	NA	2.34E-03
benzo(b)fluoranthene	NA	4.77E+09	3.91E-01				
benzo(k)fluoranthene	NA	4.77E+09	3.06E-01				
bis(2-ethylhexyl)phthalate	NA	4.77E+09	2.58E-01				
chrysene	NA	4.77E+09	2.86E-01				
dibenz(a,h)anthracene	NA	4.77E+09	1.36E-01				
fluoranthene	NA	4.77E+09	2.66E-01				
indeno(1,2,3-cd)pyrene	NA	4.77E+09	3.33E-01				

Table B-4 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 1
Via Inhalation of Particulates and Volatiles

Non-Carcinogenic Calculation			
CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	
Compound			
1,1-dichloroethene	2.43E-05	9.00E-03	2.70E-03
1,2,4-trimethylbenzene	4.18E-07	2.00E-03	2.09E-04
1,3,5-trimethylbenzene	6.44E-07	2.00E-03	3.22E-04
aroclor 1248	1.51E-12	7.00E-05	2.16E-08
aroclor 1254	1.34E-12	7.00E-05	1.92E-08
aroclor 1260	8.53E-13	7.00E-05	1.22E-08
arsenic	6.39E-11	3.00E-04	2.13E-07
benzo(a)anthracene	9.96E-12	4.00E-02	2.49E-10
benzo(a)pyrene	1.39E-11	4.00E-02	3.47E-10
benzo(b)fluoranthene	1.60E-11	4.00E-02	4.01E-10
benzo(k)fluoranthene	1.25E-11	4.00E-02	3.14E-10
bis(2-ethylhexyl)phthalate	1.06E-11	2.00E-02	5.29E-10
chrysene	1.17E-11	4.00E-02	2.93E-10
dibenzo(a,h)anthracene	5.57E-12	4.00E-02	1.39E-10
fluoranthene	1.09E-11	4.00E-01	2.73E-11
indeno(1,2,3-cd)pyrene	1.36E-11	4.00E-02	3.41E-10
naphthalene	8.40E-12	4.00E-02	2.10E-10
n-butylbenzene	4.38E-07	2.90E-01	1.51E-06
n-propylbenzene	6.90E-07	2.90E-01	2.38E-06
p-cymene	1.64E-07	1.00E-01	1.64E-06
phenanthrene	8.32E-12	3.00E-01	2.77E-11
pyrene	1.28E-11	3.00E-01	4.26E-11
tetrachloroethene	1.74E-06	1.00E-01	1.74E-05
trichloroethene	1.89E-06	7.35E-03	2.58E-04
xylenes	5.39E-07	2.00E-01	2.69E-06
HQ Summation =			3.5E-03

Carcinogenic Calculation			
CDI (mg/kg-d)	CSF (mg/kg-d)		ILCR (unitless)
Compound			
1,1-dichloroethene	3.47E-07	NA	NA
1,2,4-trimethylbenzene	5.97E-09	NA	NA
1,3,5-trimethylbenzene	9.21E-09	NA	NA
aroclor 1248	2.16E-14	7.70E+00	1.66E-13
aroclor 1254	1.92E-14	7.70E+00	1.48E-13
aroclor 1260	1.22E-14	7.70E+00	9.38E-14
arsenic	9.13E-13	1.20E+01	1.10E-11
benzo(a)anthracene	1.42E-13	3.90E-01	5.55E-14
benzo(a)pyrene	1.99E-13	3.90E+00	7.74E-13
benzo(b)fluoranthene	2.29E-13	3.90E-01	8.93E-14
benzo(k)fluoranthene	1.79E-13	3.90E-01	6.99E-14
bis(2-ethylhexyl)phthalate	1.51E-13	8.40E-03	1.27E-15
chrysene	1.67E-13	3.90E-02	6.53E-15
dibenzo(a,h)anthracene	7.96E-14	4.10E+00	3.27E-13
fluoranthene	1.56E-13	NA	NA
indeno(1,2,3-cd)pyrene	1.95E-13	3.90E-01	7.60E-14
naphthalene	1.20E-13	NA	NA
n-butylbenzene	6.26E-09	NA	NA
n-propylbenzene	9.85E-09	NA	NA
p-cymene	2.35E-09	NA	NA
phenanthrene	1.19E-13	NA	NA
pyrene	1.83E-13	NA	NA
tetrachloroethene	2.49E-08	2.10E-02	5.22E-10
trichloroethene	2.71E-08	1.00E-02	2.71E-10
xylenes	7.70E-09	NA	NA
ILCR Summation =			8.1E-10

Table B-5
Summary of Potential Health Effects
On-Site Construction Worker AOPC 2

<u>Exposure Pathway</u>	<u>Receptor Hazard Quotient</u>
Inhalation of Particulates and Volatiles	7.1E-03
Incidental ingestion of soils	3.5E-03
Dermal contact with soils	4.4E-03
Total Population Hazard Quotient =	1.5E-02

<u>Exposure Pathway</u>	<u>Receptor Incremental Lifetime Cancer Risk</u>
Inhalation of Particulates and Volatiles	1.8E-09
Incidental ingestion of soils	2.8E-07
Dermal contact with soils	4.8E-07
Total Population Incremental Lifetime Cancer Risk =	7.7E-07

Table B-6
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Incidental Ingestion of Soils

Intake Equation	=	CS X EF X ED X CF X IR BW X AT	
IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day	
CF	Conversion factor	1.0E-06 kg/mg	
EF	Exposure frequency	250 d/year	
EDn	Exposure duration for non-carcinogens	1 year	
EDc	Exposure duration for carcinogens	1 year	
BW	Body weight	70 kg	
ATc	Average time for carcinogens (lifetime)	25550 day	
ATn	Average time for non-carcinogens (EDn x 365)	365 day	
CS	Concentration of chemicals in soil (see Table 5-1)		
Chemical Concentrations			
Compound	Concentration	Compound	Concentration
1,1-dichloroethene	4.05E-03	naphthalene	2.13E-01
1,2,4-trimethylbenzene	1.85E-02	n-butylbenzene	6.18E-03
1,3,5-trimethylbenzene	8.93E-03	n-propylbenzene	5.78E-03
aroclor 1248	1.63E-02	p-cymene	6.45E-03
aroclor 1254	1.63E-02	phenanthrene	1.42E-01
aroclor 1260	1.72E-02	pyrene	1.28E-01
arsenic	NA	tetrachloroethene	4.53E-03
benzo(a)anthracene	1.06E-01	trichloroethene	8.56E-03
benzo(a)pyrene	2.24E-01	xylenes	6.45E-03
benzo(b)fluoranthene	2.28E-01		
benzo(k)fluoranthene	2.05E-01		
bis(2-ethylhexyl)phthalate	1.03E-01		
chrysene	1.22E-01		
dibenz(a,h)anthracene	8.54E-02		
fluoranthene	1.18E-01		
indeno(1,2,3-cd)pyrene	2.12E-01		

Table B-6 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Incidental Ingestion of Soils

Compound	Non-Carcinogenic Calculation			Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	CDI (mg/kg-d)	CSF (mg/kg-d)	ILCR (unitless)
1,1-dichloroethene	1.90E-08	9.00E-03	2.11E-06	1,1-dichloroethene	2.72E-10	NA
1,2,4-trimethylbenzene	8.69E-08	5.00E-01	1.74E-07	1,2,4-trimethylbenzene	1.24E-09	NA
1,3,5-trimethylbenzene	4.19E-08	5.00E-01	8.39E-08	1,3,5-trimethylbenzene	5.99E-10	NA
aroclor 1248	7.66E-08	7.00E-05	1.09E-03	aroclor 1248	1.09E-09	7.70E+00
aroclor 1254	7.66E-08	7.00E-05	1.09E-03	aroclor 1254	1.09E-09	7.70E+00
aroclor 1260	8.08E-08	7.00E-05	1.15E-03	aroclor 1260	1.15E-09	7.70E+00
arsenic	NA	3.00E-04	NA	arsenic	NA	8.89E-09
benzo(a)anthracene	4.98E-07	4.00E-02	1.24E-05	benzo(a)anthracene	7.11E-09	NA
benzo(a)pyrene	1.05E-06	4.00E-02	2.63E-05	benzo(a)pyrene	1.50E-08	1.50E+00
benzo(b)fluoranthene	1.07E-06	4.00E-02	2.68E-05	benzo(b)fluoranthene	1.52E-08	1.15E+01
benzo(k)fluoranthene	9.63E-07	4.00E-02	2.41E-05	benzo(k)fluoranthene	1.38E-08	1.15E+00
bis(2-ethylhexyl)phthalate	4.84E-07	2.00E-02	2.42E-05	bis(2-ethylhexyl)phthalate	6.91E-09	8.40E-03
chrysene	5.73E-07	4.00E-02	1.43E-05	chrysene	8.19E-09	1.15E-01
dibenz(a,h)anthracene	4.01E-07	4.00E-02	1.00E-05	dibenz(a,h)anthracene	5.73E-09	4.10E+00
fluoranthene	5.54E-07	4.00E-01	1.39E-06	fluoranthene	7.92E-09	NA
indeno(1,2,3-cd)pyrene	9.96E-07	4.00E-02	2.49E-05	indeno(1,2,3-cd)pyrene	1.42E-08	1.15E+00
naphthalene	1.01E-06	4.00E-02	2.52E-05	naphthalene	1.44E-08	NA
n-butylbenzene	2.90E-08	1.00E-01	2.90E-07	n-butylbenzene	4.15E-10	NA
n-propylbenzene	2.71E-08	1.00E-01	2.71E-07	n-propylbenzene	3.88E-10	NA
p-cymene	3.03E-08	1.00E-01	3.03E-07	p-cymene	4.33E-10	NA
phenanthrene	6.67E-07	3.00E-01	2.22E-06	phenanthrene	9.53E-09	NA
pyrene	6.01E-07	3.00E-01	2.00E-06	pyrene	8.59E-09	NA
tetrachloroethene	2.13E-08	1.00E-01	2.13E-07	tetrachloroethene	3.04E-10	5.10E-02
trichloroethene	4.02E-08	7.35E-03	5.47E-06	trichloroethene	5.74E-10	1.50E-02
xylenes	3.03E-08	2.00E+00	1.51E-08	xylenes	4.33E-10	NA
HQ Summation =						2.8E-07

Table B-7
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Dermal Contact with Soils

Intake Equation	=	CS X CF X EF X ED X AF X ABS X SA BW X AT
SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm ² /day
AF	Adherence Factor	1 mg/cm ²
ABS	Absorption factor (see table below)	0.0E-06 kg/mg cm ²
CF	Conversion factor	250 day/year
EF	Exposure frequency	1 year
EDn	Exposure duration for non-carcinogens	1 year
EDc	Exposure duration for carcinogens	1 year
BW	Body weight	70 kg
ATe	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	365 day
CS	Concentration of chemicals in soil (see Table 5-1)	

Chemical Concentrations					
Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
1,1-dichloroethene	1.00E-01	4.05E-03	naphthalene	1.50E-01	2.15E-01
1,2,4-trimethylbenzene	1.00E-01	1.85E-02	n-butylbenzene	1.00E-01	6.18E-03
1,3,5-trimethylbenzene	1.00E-01	8.93E-03	n-propylbenzene	1.00E-01	5.78E-03
aroclor 248	1.00E-01	1.63E-02	p-cymene	1.00E-01	6.45E-03
aroclor 1254	1.00E-01	1.63E-02	phenanthrene	1.50E-01	1.42E-01
aroclor 2660	1.00E-01	1.72E-02	pyrene	1.50E-01	1.28E-01
arsenic	3.00E-02	NA	tetrachloroethylene	1.00E-01	4.53E-03
benzo(a)anthracene	1.50E-01	1.06E-01	trichloroethylene	1.00E-01	8.56E-03
benzo(a)pyrene	1.50E-01	2.24E-01	xylenes	1.00E-01	6.45E-03
benzo(b)fluoranthene	1.50E-01	2.28E-01			
benzo(k)fluoranthene	1.50E-01	2.05E-01			
bis(2-ethylhexyl)phthalate	1.00E-01	1.03E-01			
chrysene	1.50E-01	1.22E-01			
dibenz(a,h)anthracene	1.50E-01	8.54E-02			
fluoranthene	1.00E-01	1.18E-01			
indeno(1,2,3-cd)pyrene	1.00E-01	2.12E-01			

Table B-7 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Dermal Contact with Soils

Non-Carcinogenic Calculation				
Compound	CDI (mg/kg-d)	RFD (mg/kg-d)	HQ (unitless)	
1,1-dichloroethene	2.30E-08	9.00E-03	2.55E-06	
1,2,4-trimethylbenzene	1.05E-07	5.00E-01	2.10E-07	
1,3,5-trimethylbenzene	5.07E-08	5.00E-01	1.01E-07	
aroclor 1248	9.25E-08	7.00E-05	1.32E-03	
aroclor 1254	9.25E-08	7.00E-05	1.32E-03	
aroclor 1260	9.76E-08	7.00E-05	1.39E-03	
arsenic	NA	3.00E-04	NA	
benzo(a)anthracene	9.02E-07	4.00E-02	2.26E-05	
benzo(a)pyrene	1.91E-06	4.00E-02	4.77E-05	
benzo(b)fluoranthene	1.94E-06	4.00E-02	4.85E-05	
benzo(k)fluoranthene	1.75E-06	4.00E-02	4.36E-05	
bis(2-ethylhexyl)phthalate	5.85E-07	2.00E-02	2.92E-05	
chrysene	1.04E-06	4.00E-02	2.60E-05	
dibenz(a,h)anthracene	7.27E-07	4.00E-02	1.82E-05	
fluoranthene	6.70E-07	4.00E-01	1.67E-06	
indenol(1,2,3-cd)pyrene	1.20E-06	4.00E-02	3.01E-05	
naphthalene	1.83E-06	4.00E-02	4.58E-05	
n-butylbenzene	3.51E-08	1.00E-01	3.51E-07	
n-propylbenzene	3.28E-08	1.00E-01	3.28E-07	
p-cymene	3.66E-08	1.00E-01	3.66E-07	
phenanthrene	1.21E-06	3.00E-01	4.03E-06	
pyrene	1.09E-06	3.00E-01	3.63E-06	
tetrachloroethene	2.57E-08	1.00E-01	2.57E-07	
trichloroethene	4.86E-08	7.35E-03	6.61E-06	
xylenes	3.66E-08	2.00E+00	1.83E-08	
				1.4E-03
				HQ summation =

HQ Summation = 4.4E-03

Compound	Carcinogenic Calculation			ILCR (unitless)
	CDI (mg/kg-d)	CSF (mg/kg-d)-1	ICR (mg/kg-d)-1	
1,1-dichloroethene	3.28E-10	NA	NA	NA
1,2,4-trimethylbenzene	1.50E-09	NA	NA	NA
1,3,5-trimethylbenzene	7.24E-10	NA	NA	NA
aeroclor 1248	1.32E-09	7.70E+00	1.02E-08	1.02E-08
aeroclor 1254	1.32E-09	7.70E+00	1.02E-08	1.02E-08
aeroclor 1260	1.39E-09	7.70E+00	1.07E-08	1.07E-08
arsenic	NA	1.50E+00	NA	NA
benzo(a)anthracene	1.29E-08	1.15E+00	1.48E-08	1.48E-08
benzo(a)pyrene	2.72E-08	1.15E+01	3.13E-07	3.13E-07
benzo(b)fluoranthene	2.77E-08	1.15E+00	3.19E-08	3.19E-08
benzo(k)fluoranthene	2.49E-08	1.15E+00	2.87E-08	2.87E-08
bis(2-ethylhexyl)phthalate	8.35E-09	8.40E-03	7.01E-11	7.01E-11
chrysene	1.48E-08	1.15E-01	1.71E-09	1.71E-09
dibenz(a,h)anthracene	1.04E-08	4.10E+00	4.26E-08	4.26E-08
fluoranthene	9.57E-09	NA	NA	NA
indeno(1,2,3-cd)pyrene	1.72E-08	1.15E+00	1.98E-08	1.98E-08
naphthalene	2.61E-08	NA	NA	NA
n-butylbenzene	5.01E-10	NA	NA	NA
n-propylbenzene	4.69E-10	NA	NA	NA
p-cymene	5.23E-10	NA	NA	NA
phenanthrene	1.73E-08	NA	NA	NA
pyrene	1.56E-08	NA	NA	NA
tetrachloroethene	3.67E-10	5.10E-02	1.87E-11	1.87E-11
trichloroethene	6.94E-10	1.50E-02	1.04E-11	1.04E-11
xylenes	5.23E-10	NA	NA	NA

HCR Summation = 4.8E-07

Table B-8
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Inhalation of Particulates and Volatiles

Intake_Equation	=	CS X (1/VF + 1/PEF) X EFF X ED X ET X IR BW X AT
IR	Inhalation rate of gases (RAGS, 1989)	2.5 m/h
EF	Exposure frequency	250 days/year
EDn	Exposure duration for non-carcinogens	1 year
EDc	Exposure duration for carcinogens	1 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	2550 days
ATn	Average time for non-carcinogens (EDn x 365)	365 days
ET	Exposure time outdoors	8 h/d
CS	Concentration of chemicals in soil	(see Table 5-1)
VF	Volatilization Factor	(see Table 5-4)
PEF	Particulate Emission Factor	(see Section 5.3.1.2)
Chemical Concentrations		
Compound	VF (m ³ /kg)	PEF (m ³ /kg)
Compound	VF (m ³ /kg)	PEF (m ³ /kg)
1,1-dichloroethene	2.07E+01	NA
1,2,4-trimethylbenzene	1.79E+03	NA
1,3,5-trimethylbenzene	8.99E+02	NA
aroclor 1248	NA	4.77E+09
aroclor 1254	NA	4.77E+09
aroclor 1260	NA	4.77E+09
arsenic	NA	4.77E+09
benzo(a)anthracene	NA	4.77E+09
benzo(a)pyrene	NA	4.77E+09
benzo(b)fluoranthene	NA	4.77E+09
benzo(k)fluoranthene	NA	4.77E+09
bis(2-ethylhexyl)phthalate	NA	4.77E+09
chrysene	NA	4.77E+09
dibenzo(a,h)anthracene	NA	4.77E+09
fluoranthene	NA	4.77E+09
indeno(1,2,3-cd)pyrene	NA	4.77E+09

Table B-8 (cont.)
Summary of Unit Risk Characterization
On-Site Construction Worker AOPC 2
Via Inhalation of Particulates and Volatiles

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)
1,1-dichloroethene	3.83E-05	9.00E-03	4.26E-03
1,2,4-trimethylbenzene	2.02E-06	2.00E-03	1.01E-03
1,3,5-trimethylbenzene	1.94E-06	2.00E-03	9.72E-04
aroclor 1248	6.68E-13	7.00E-05	9.54E-09
aroclor 1254	6.68E-13	7.00E-05	9.54E-09
aroclor 1260	7.05E-13	7.00E-05	1.01E-08
arsenic	NA	3.00E-04	NA
benzo(a)anthracene	4.34E-12	4.00E-02	1.09E-10
benzo(a)pyrene	9.18E-12	4.00E-02	2.30E-10
benzo(b)fluoranthene	9.35E-12	4.00E-02	2.34E-10
benzo(k)fluoranthene	8.40E-12	4.00E-02	2.10E-10
bis(2-ethylhexyl)phthalate	4.22E-12	2.00E-02	2.11E-10
chrysene	5.00E-12	4.00E-02	1.25E-10
dibenzo(a,h)anthracene	3.50E-12	4.00E-02	8.75E-11
fluoranthene	4.84E-12	4.00E-01	1.21E-11
indeno(1,2,3-cd)pyrene	8.69E-12	4.00E-02	2.17E-10
naphthalene	8.81E-12	4.00E-02	2.20E-10
n-butylbenzene	9.64E-07	2.90E-01	3.32E-06
n-propylbenzene	1.55E-06	2.90E-01	5.35E-06
p-cymene	4.29E-07	1.00E-01	4.29E-06
phenanthrene	5.82E-12	3.00E-01	1.94E-11
pyrene	5.25E-12	3.00E-01	1.75E-11
tetrachloroethene	2.93E-06	1.00E-01	2.93E-05
trichloroethene	6.16E-06	7.35E-03	8.39E-04
xylenes	1.49E-06	2.00E-01	7.43E-06
HQ Summation =			7.1E-03

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d)-1	ILCR (unitless)
1,1-dichloroethene	5.48E-07	NA	NA
1,2,4-trimethylbenzene	2.89E-08	NA	NA
1,3,5-trimethylbenzene	2.78E-08	NA	NA
aroclor 1248	9.54E-15	7.70E+00	7.35E-14
aroclor 1254	9.54E-15	7.70E+00	7.35E-14
aroclor 1260	1.01E-14	7.70E+00	7.76E-14
arsenic	NA	1.20E+01	NA
benzo(a)anthracene	6.21E-14	3.90E-01	2.42E-14
benzo(a)pyrene	1.31E-13	3.90E+00	5.12E-13
benzo(b)fluoranthene	1.34E-13	3.90E-01	5.21E-14
benzo(k)fluoranthene	1.20E-13	3.90E-01	4.68E-14
bis(2-ethylhexyl)phthalate	6.03E-14	8.40E-03	5.07E-16
chrysene	7.14E-14	3.90E-02	2.79E-15
dibenzo(a,h)anthracene	5.00E-14	4.10E+00	2.05E-13
fluoranthene	6.91E-14	NA	NA
indeno(1,2,3-cd)pyrene	1.24E-13	3.90E-01	4.84E-14
naphthalene	1.26E-13	NA	NA
n-butylbenzene	1.38E-08	NA	NA
n-propylbenzene	2.22E-08	NA	NA
p-cymene	6.13E-09	NA	NA
phenanthrene	8.32E-14	NA	NA
pyrene	7.50E-14	NA	NA
tetrachloroethene	4.19E-08	2.10E-02	8.79E-10
trichloroethene	8.80E-08	1.00E-02	8.80E-10
xylenes	2.12E-08	NA	NA
ILCR Summation =			1.8E-09

Table B-9
Summary of Potential Health Effects
On-Site Commercial/Industrial Worker AOPC 1

<u>Exposure Pathway</u>	<u>Receptor Hazard Quotient</u>
Inhalation of Indoor Air	6.4E-05
Total Population Hazard Quotient =	6.4E-05
<u>Exposure Pathway</u>	<u>Receptor Incremental Lifetime Cancer Risk</u>
Inhalation of Indoor Air	1.2E-10
Total Population Incremental Lifetime Cancer Risk =	1.2E-10

Table B-10
Summary of Risk Quantitation
On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Indoor Air

Intake Equation	=	CS X EF X ED X ET X IR BW X AT	
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m³/h	
EF	Exposure frequency	125 day/year	
EDn	Exposure duration for non-carcinogens	25 year	
EDc	Exposure duration for carcinogens	25 year	
BW	Body weight	70 kg	
ATc	Average time for carcinogens (lifetime)	25550 days	
ATn	Average time for non-carcinogens (EDn x 365)	9125 days	
ET	Exposure time indoors	8 h/d	
Ci	Concentration of chemicals indoors (indoor + outdoor) (see Tables 5-6 and 5-7)		
Chemical Concentrations			
Compound	Concentration (mg/m³)	Compound	Concentration (mg/m³)
1,1-dichloroethene	1.64E-05	naphthalene	NA
1,2,4-trimethylbenzene	2.80E-08	n-butylbenzene	1.97E-08
1,3,5-trimethylbenzene	5.58E-08	n-propylbenzene	6.01E-08
aroclor 1248	NA	p-cymene	3.54E-09
aroclor 1254	NA	phenanthrene	NA
aroclor 1260	NA	pyrene	NA
arsenic	NA	tetrachloroethylene	2.33E-07
benzo(a)anthracene	NA	trichloroethylene	5.45E-07
benzo(a)pyrene	NA	xylenes	3.82E-08
benzo(b)fluoranthene	NA		
benzo(k)fluoranthene	NA		
bis(2-ethylhexyl)phthalate	NA		
chrysene	NA		
dibenz(a,h)anthracene	NA		
fluoranthene	NA		
indeno(1,2,3-cd)pyrene	NA		

Table B-10 (cont.)
Summary of Risk Quantitation
On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Indoor Air

Non-Carcinogenic Calculation			Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	CDI (ng/kg-d)	CSF	ILCR (unitless)
1,1-dichloroethene	5.32E-07	9.00E-03	5.91E-05	1.90E-07	NA	NA
1,2,4-trimethylbenzene	9.09E-10	2.00E-03	4.54E-07	3.25E-10	NA	NA
1,3,5-trimethylbenzene	1.81E-09	2.00E-03	9.06E-07	6.47E-10	NA	NA
aroclor 1248	NA	7.00E-05	NA	NA	7.70E-00	NA
aroclor 1254	NA	7.00E-05	NA	NA	7.70E-00	NA
aroclor 1260	NA	7.00E-05	NA	NA	7.70E+00	NA
arsenic	NA	3.00E-04	NA	NA	1.20E+01	NA
benzo(a)anthracene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(a)pyrene	NA	4.00E-02	NA	NA	3.90E+00	NA
benzo(b)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(k)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA	NA	8.40E-03	NA
chrysene	NA	4.00E-02	NA	NA	3.90E-02	NA
dibenz(a,h)anthracene	NA	4.00E-02	NA	NA	4.10E+00	NA
fluoranthene	NA	4.00E-02	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	NA	4.00E-02	NA	NA	3.90E-01	NA
naphthalene	NA	4.00E-02	NA	NA	NA	NA
n-butylbenzene	6.40E-10	2.90E-01	2.21E-09	2.28E-10	NA	NA
n-propylbenzene	1.95E-09	2.90E-01	6.73E-09	6.97E-10	NA	NA
p-cymene	1.15E-10	1.00E-01	1.15E-09	4.11E-11	NA	NA
phenanthrene	NA	3.00E-01	NA	NA	NA	NA
pyrene	NA	3.00E-02	NA	NA	NA	NA
tetrachloroethylene	8.21E-09	1.00E-02	8.21E-07	2.93E-09	2.10E-02	6.16E-11
trichloroethylene	1.77E-08	7.33E-03	2.41E-06	6.32E-09	1.00E-02	6.32E-11
xylenes	1.24E-09	2.00E-01	6.20E-09	4.43E-10	NA	NA
HQ Summation =			6.4E-05			
ILCR Summation =			1.2E-01			

Compound	CDI (ng/kg-d)	CSF	ILCR (unitless)
1,1-dichloroethene	1.90E-07	NA	NA
1,2,4-trimethylbenzene	3.25E-10	NA	NA
1,3,5-trimethylbenzene	6.47E-10	NA	NA
aroclor 1248	NA	7.70E-00	NA
aroclor 1254	NA	7.70E-00	NA
aroclor 1260	NA	7.70E+00	NA
arsenic	NA	1.20E+01	NA
benzo(a)anthracene	NA	3.90E-01	NA
benzo(a)pyrene	NA	3.90E+00	NA
benzo(b)fluoranthene	NA	3.90E-01	NA
benzo(k)fluoranthene	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	8.40E-03	NA
chrysene	NA	3.90E-02	NA
dibenz(a,h)anthracene	NA	4.10E+00	NA
fluoranthene	NA	NA	NA
indeno(1,2,3-cd)pyrene	NA	3.90E-01	NA
naphthalene	NA	NA	NA
n-butylbenzene	2.28E-10	NA	NA
n-propylbenzene	6.97E-10	NA	NA
p-cymene	4.11E-11	NA	NA
phenanthrene	NA	NA	NA
pyrene	NA	NA	NA
tetrachloroethylene	2.93E-09	2.10E-02	6.16E-11
trichloroethylene	6.32E-09	1.00E-02	6.32E-11
xylenes	4.43E-10	NA	NA
ILCR Summation =		1.2E-01	

Table B-11
Summary of Potential Health Effects
On-Site Commercial/Industrial Worker AOPC 2

<u>Exposure Pathway</u>	<u>Receptor Hazard Quotient</u>
Inhalation of Indoor Air	8.7E-05
Total Population Hazard Quotient =	8.7E-05

<u>Exposure Pathway</u>	<u>Receptor Incremental Lifetime Cancer Risk</u>
Inhalation of Indoor Air	1.7E-10
Total Population Incremental Lifetime Cancer Risk =	1.7E-10

Table B-12
Summary of Risk Quantification
On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Indoor Air

Intake Equation	=	CS X EF X ED X ET X IR BW X AT	
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m³/h	
EF	Exposure frequency	125 days/year	
EDn	Exposure duration for non-carcinogens	25 year	
EDc	Exposure duration for carcinogens	25 year	
BW	Body weight	70 kg	
ATc	Average time for carcinogens (lifetime)	25550 days	
ATn	Average time for non-carcinogens (EDn x 365)	9125 days	
ET	Exposure time indoor	8 h/d	
Ci	Concentration of chemicals indoors (indoor + outdoor)	(see Tables 5-6 and 5-7)	
Chemical Concentrations			
Compound	Concentration (mg/m³)	Compound	Concentration (mg/m³)
1,1-dichloroethene	2.23E-05	naphthalene	NA
1,2,4-trimethylbenzene	4.45E-08	n-butylbenzene	2.53E-08
1,3,5-trimethylbenzene	7.97E-08	n-propylbenzene	8.01E-08
aroclor 1248	NA	p-cymene	4.65E-09
aroclor 1254	NA	phenanthrene	NA
aroclor 1260	NA	pyrene	NA
arsenic	NA	tetrachloroethene	2.90E-07
benzo(a)anthracene	NA	trichloroethene	8.25E-07
benzo(a)pyrene	NA	xylenes	3.01E-08
benzo(b)fluoranthene	NA		
benzo(k)fluoranthene	NA		
bis(2-ethylhexyl)phthalate	NA		
chrysene	NA		
dibenzo(a,h)anthracene	NA		
fluoranthene	NA		
indeno(1,2,3-cd)pyrene	NA		

Table B-12 (cont.)
Summary of Risk Quantitation
On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Indoor Air

Non-Carcinogenic Calculation					
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)		
1,1,1-trichloroethene	7.24E-07	9.00E-03	8.05E-05		
1,1,2,4-trimethylbenzene	1.45E-09	2.00E-03	7.23E-07		
1,1,3,5-trimethylbenzene	2.59E-09	2.00E-03	1.29E-06		
chloroform (1248)	NA	7.00E-05	NA		
chloroform (1254)	NA	7.00E-05	NA		
chloroform (1260)	NA	7.00E-05	NA		
arsenic	NA	3.00E-04	NA		
benzo(a)anthracene	NA	4.00E-02	NA		
benzo(a)pyrene	NA	4.00E-02	NA		
benzo(b)fluoranthene	NA	4.00E-02	NA		
benzo(k)fluoranthene	NA	4.00E-02	NA		
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA		
chrysene	NA	4.00E-02	NA		
dibenzo(a,b)anthracene	NA	4.00E-02	NA		
fluoranthene	NA	4.00E-02	NA		
indeno(1,2,3-cd)pyrene	NA	4.00E-02	NA		
naphthalene	NA	4.00E-02	NA		
n-butylbenzene	8.22E-10	2.90E-01	2.83E-09		
n-propylbenzene	2.60E-09	2.90E-01	8.97E-09		
p-cymene	1.51E-10	1.00E-01	1.51E-09		
phenanthrene	NA	3.00E-01	NA		
pyrene	NA	3.00E-02	NA		
tetrachloroethene	9.42E-09	1.00E-02	9.42E-07		
trichloroethene	2.68E-08	7.35E-03	3.65E-06		
xylenes	9.77E-10	2.00E-01	4.88E-09		

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d) _i	ILCR (unitless)
1,1-dichloroethene	2.59E-07	NA	NA
1,2,4-trimethylbenzene	5.16E-10	NA	NA
1,3,5-trimethylbenzene	9.25E-10	NA	NA
arocloc 1248	NA	7.70E+00	NA
aroclor 1254	NA	7.70E+00	NA
aroclor 1260	NA	7.70E+00	NA
arsenic	NA	1.20E+01	NA
benzo(a)anthracene	NA	3.90E-01	NA
benzol a pyrene	NA	3.90E+00	NA
benzol b) fluoranthene	NA	3.90E-01	NA
benzol(k) fluoranthene	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	8.40E-03	NA
chrysene	NA	3.90E-02	NA
dibenzo(a,h)anthracene	NA	4.10E+00	NA
fluoranthene	NA	NA	NA
indeno[1,2,3-cd]pyrene	NA	3.90E-01	NA
naphthalene	NA	NA	NA
n-butylbenzene	2.94E-10	NA	NA
n-propylbenzene	9.29E-10	NA	NA
p-cymene	5.39E-11	NA	NA
phenanthrene	NA	NA	NA
pyrene	NA	NA	NA
tetrachloroethene	3.36E-09	2.10E-02	7.07E-11
trichloroethene	9.57E-09	1.00E-02	9.57E-11
xylenes	3.49E-10	NA	NA

ILCR Summation = 1.7E-10

H2O Summation = 8.7E-05

Table B-13
Summary of Potential Health Effects
DTSC Commercial/Industrial Worker AOPC 1

Exposure Pathway	Receptor Hazard Quotient
Inhalation of Indoor Air	3.2E-05
Inhalation of Outdoor Air	2.4E-05
Incidental Ingestion of Soil	1.6E-03
Dermal Contact with Soil	2.9E-03
Total Population Hazard Quotient =	4.6E-03

Exposure Pathway	Receptor Incremental Lifetime Cancer Risk
Inhalation of Indoor Air	6.2E-11
Inhalation of Outdoor Air	7.3E-11
Incidental Ingestion of Soil	7.9E-07
Dermal Contact with Soil	3.6E-06
Total Population Incremental Lifetime Cancer Risk =	4.4E-06

Table B-14
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Incidental Ingestion of Soils

Intake Equation	CS X EF X ED X CF X IR = BW X AT	Concentration (mg/kg)	Compound	Concentration (mg/kg)	
IRs	Ingestion rate of soil (RAGS, 1989)	50 mg/day	naphthalene	2.05E-01	
CF	Conversion factor	1.0E-06 kg/mg	n-butylbenzene	2.81E-03	
EF	Exposure frequency	125 d/year	n-propylbenzene	2.57E-03	
EDn	Exposure duration for non-carcinogens	25 year	p-cymene	2.47E-03	
EDc	Exposure duration for carcinogens	25 year	phenanthrene	2.03E-01	
BW	Body weight	70 kg	pyrene	3.12E-01	
ATc	Average time for carcinogens (lifetime)	25550 day	tetrachloroethene	2.69E-03	
ATn	Average time for non-carcinogens (EDn x 365)	9125 day	trichloroethylene	2.63E-03	
CS	Concentration of chemicals in soil (see Table 5-1)		xylenes	2.34E-03	
Chemical Concentrations					
Compound	Concentration (mg/kg)	Compound	Concentration (mg/kg)	Compound	
1,1-dichloroethene	2.57E-03	benzo(b)fluoranthene	3.91E-01	benzo(k)fluoranthene	3.06E-01
1,2,4-trimethylbenzene	3.82E-03	benzo(k)fluoranthene	3.06E-01	bis(2-ethylhexyl)phthalate	2.58E-01
1,3,5-trimethylbenzene	2.96E-03	chrysene	2.86E-01	chrysene	2.86E-01
aroclor 1248	3.69E-02	dibenz(a,h)anthracene	1.36E-01	dibenz(a,h)anthracene	1.36E-01
aroclor 1254	3.28E-02	fluoranthene	2.66E-01	fluoranthene	2.66E-01
aroclor 1260	2.08E-02	indeno(1,2,3-cd)pyrene	3.33E-01	indeno(1,2,3-cd)pyrene	3.33E-01
arsenic	1.56E+00				
benzo(a)anthracene	2.43E-01				
benzo(a)pyrene	3.39E-01				
benzo(b)fluoranthene	3.91E-01				
benzo(k)fluoranthene	3.06E-01				
bis(2-ethylhexyl)phthalate	2.58E-01				
chrysene	2.86E-01				
dibenz(a,h)anthracene	1.36E-01				
fluoranthene	2.66E-01				
indeno(1,2,3-cd)pyrene	3.33E-01				

Table B-14 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Incidental Ingestion of Soils

Table B-15
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Dermal Contact with Soils

Intake Equation

$$= \frac{CS \times CF \times EF \times ED \times AF \times ABS \times SA}{BW \times AT}$$

SA	Surface area of exposed skin (50th percentile, hands only)
AF	Adherence Factor
ABS	Absorption factor (see table below)
CF	Conversion factor
EF	Exposure frequency
EDn	Exposure duration for non-carcinogens
EDc	Exposure duration for carcinogens
BW	Body weight
ATc	Average time for carcinogens (lifetime)
ATn	Average time for non-carcinogens ($EDn \times 365$)
CS	Concentration of chemicals in soil (see Table 5-1)

Chemical Concentrations

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
1,1-dichloroethene	1.00E-01	2.57E-03	naphthalene	1.50E-01	2.05E-01
1,2,4-trimethylbenzene	1.00E-01	3.82E-03	n-butylbenzene	1.00E-01	2.81E-03
1,3,5-trimethylbenzene	1.00E-01	2.96E-03	n-propylbenzene	1.00E-01	2.57E-03
arocior 1248	1.00E-01	3.69E-02	p-cymene	1.00E-01	2.47E-03
aroclor 1254	1.00E-01	3.28E-02	phenanthrene	1.50E-01	2.03E-01
aroclor 1260	1.00E-01	2.08E-02	pyrene	1.50E-01	3.12E-01
arsenic	3.00E-02	1.56E+00	tetrachloroethylene	1.00E-01	2.69E-03
benzo(a)anthracene	1.50E-01	2.43E-03	trichloroethene	1.00E-01	2.63E-03
benzo(a)pyrene	1.50E-01	3.39E-01	xylenes	1.00E-01	2.34E-03
benzo(b)fluoranthene	1.50E-01	3.91E-01			
benzo(k)fluoranthene	1.50E-01	3.06E-01			
bis(2-ethylhexyl)phthalate	1.00E-01	2.58E-01			
chrysene	1.50E-01	2.86E-01			
dibenzo(a,h)anthracene	1.50E-01	1.36E-01			
fluoranthene	1.00E-01	2.66E-01			
indeno(1,2,3-cd)pyrene	1.00E-01	3.33E-01			

Table B-15 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Dermal Contact with Soils

Non-Carcinogenic Calculation				Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)	Compound	CDI (mg/kg-d)	CSF (mg/kg-d) ₋₁	UR (unitless)
1,1-dichloroethene	2.82E-07	9.00E-03	2.00E+00	1,1-dichloroethene	9.07E-10	NA	NA
1,2,4-trimethylbenzene	3.78E-09	5.00E-01	7.50E-09	1,2,4-trimethylbenzene	1.35E-09	NA	NA
1,3,5-trimethylbenzene	2.93E-09	5.00E-01	5.85E-09	1,3,5-trimethylbenzene	1.04E-09	NA	NA
aroclor 1248	3.65E-08	7.00E-05	5.21E-04	aroclor 1248	1.30E-08	7.70E+00	1.00E-07
aroclor 1254	3.24E-08	7.00E-05	4.63E-04	aroclor 1254	1.16E-08	7.70E+00	8.91E-08
aroclor 1260	2.06E-08	7.00E-05	2.94E-04	aroclor 1260	7.34E-09	7.70E+00	5.65E-08
arsenic	4.63E-07	3.00E-04	1.50E-03	arsenic	1.65E-07	1.50E+00	2.48E-07
benzo(a)anthracene	3.60E-07	4.00E-02	9.00E-06	benzo(a)anthracene	1.29E-07	1.15E+00	1.48E-07
benzo(a)pyrene	5.03E-07	4.00E-02	1.20E-05	benzo(a)pyrene	1.79E-07	1.15E+01	2.06E-06
benzo(b)fluoranthene	5.80E-07	4.00E-02	1.45E-05	benzo(b)fluoranthene	2.07E-07	1.15E+00	2.38E-07
benzo(k)fluoranthene	4.54E-07	4.00E-02	1.13E-05	benzo(k)fluoranthene	1.62E-07	1.15E+00	1.86E-07
bis(2-ethylhexyl)phthalate	2.55E-07	2.00E-02	1.27E-05	bis(2-ethylhexyl)phthalate	9.11E-08	8.40E-03	7.65E-10
chlorene	4.24E-07	4.00E-02	1.00E-05	chlorene	1.51E-07	1.15E+01	1.74E-08
dibenzof(3,h)anthracene	2.02E-07	4.00E-02	5.00E-06	dibenzof(3,h)anthracene	7.20E-08	4.10E+00	2.95E-07
fluoranthene	2.63E-07	4.00E-02	6.57E-06	fluoranthene	9.39E-08	NA	NA
indenof(1,2,3-cd)pyrene	3.29E-07	4.00E-02	8.23E-06	indenof(1,2,3-cd)pyrene	1.18E-07	1.15E+00	1.35E-07
naphthalene	3.04E-07	4.00E-02	7.60E-06	naphthalene	1.09E-07	NA	NA
n-butylbenzene	2.78E-09	1.00E-01	2.78E-08	n-butylbenzene	9.92E-10	NA	NA
n-propylbenzene	2.54E-09	1.00E-01	2.54E-08	n-propylbenzene	9.07E-10	NA	NA
p-cymene	2.44E-09	1.00E-01	2.44E-08	p-cymene	8.72E-10	NA	NA
phenanthrene	3.01E-07	3.00E-01	1.00E-06	phenanthrene	1.07E-07	NA	NA
pyrene	4.63E-07	3.00E-02	1.54E-05	pyrene	1.65E-07	NA	NA
tetrachloroethylene	2.66E-09	1.00E-02	2.66E-07	tetrachloroethylene	9.49E-10	5.10E-02	4.84E-11
trichloroethylene	2.60E-09	7.35E-03	3.54E-07	trichloroethylene	9.28E-10	1.50E-02	1.39E-11
xylenes	2.31E-09	2.00E+00	1.16E-09	xylenes	8.26E-10	NA	NA

WHO Summation = 29E-03

WCB Summation = 3.6E-06

Table B-16
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Indoor Air

Intake Equation	$C_i \times EF \times ED \times ET \times IR$ = $BW \times AT$	Chemical Concentrations	
Compound	Concentration (mg/m³)	Compound	Concentration (mg/m³)
IR	Inhalation rate of gases (RAGS, 1989)	naphthalene	NA
EF	Exposure frequency	n-butylbenzene	1.97E-08
EDn	Exposure duration for non-carcinogens	n-propylbenzene	6.01E-08
EDc	Exposure duration for carcinogens	p-cymene	3.54E-09
BW	Body weight	phenanthrene	NA
ATc	Average time for carcinogens (lifetime)	pyrene	NA
ATn	Average time for non-carcinogens (EDn x 365)	tetrachloroethene	2.53E-07
ET	Exposure time indoor	trichloroethene	5.49E-07
Ci	Concentration of chemicals indoors (indoor + outdoor) (see Tables 5-6 and 5-7)	xylenes	3.82E-08

Table B-16 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Indoor Air

Compound	Non-Carcinogenic Calculation			Carcinogenic Calculation			
	CDI (mg/kg-d)	RID (mg/kg-d)	HQ (unitless)		CDI (mg/kg-d)	CSF	ILCR (unitless)
1,1-dichloroethene	2.66E-07	9.00E-03	2.95E-05	9.50E-08	NA	NA	NA
1,2,4-trimethylbenzene	4.54E-10	2.00E-03	2.27E-07	1.62E-10	NA	NA	NA
1,3,5-trimethylbenzene	9.06E-10	2.00E-03	4.53E-07	3.24E-10	NA	NA	NA
aroclor 1248	NA	7.00E-05	NA	NA	7.70E+00	NA	NA
aroclor 1254	NA	7.00E-05	NA	NA	7.70E+00	NA	NA
aroclor 1260	NA	7.00E-05	NA	NA	7.70E+00	NA	NA
arsenic	NA	3.00E-04	NA	NA	1.20E+01	NA	NA
benzo(a)anthracene	NA	4.00E-02	NA	NA	3.90E-01	NA	NA
benzo(a)pyrene	NA	4.00E-02	NA	NA	3.90E+00	NA	NA
benzo(b)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA	NA
benzo(k)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA	NA	8.40E-03	NA	NA
chrysene	NA	4.00E-02	NA	NA	3.90E-02	NA	NA
dibenz(a,h)anthracene	NA	4.00E-02	NA	NA	4.10E+00	NA	NA
fluoranthene	NA	4.00E-02	NA	NA	NA	NA	NA
indenol(1,2,3-cd)pyrene	NA	4.00E-02	NA	NA	3.90E-01	NA	NA
naphthalene	NA	4.00E-02	NA	NA	NA	NA	NA
n-butylbenzene	3.20E-10	2.90E-01	1.10E-09	1.14E-10	NA	NA	NA
n-propylbenzene	9.76E-10	2.90E-01	3.37E-09	3.49E-10	NA	NA	NA
p-cymene	5.75E-11	1.00E-01	5.75E-10	2.05E-11	NA	NA	NA
phenanthrene	NA	3.00E-01	NA	NA	NA	NA	NA
pyrene	NA	3.00E-02	NA	NA	NA	NA	NA
tetrachloroethene	4.11E-09	1.00E-02	4.11E-07	1.47E-09	2.10E-02	3.08E-11	
trichloroethene	8.85E-09	7.35E-03	1.20E-06	3.16E-09	1.00E-02	3.16E-11	
xylenes	6.20E-10	2.00E-01	3.10E-09	2.22E-10	NA	NA	
HQ Summation =			3.2E-05				

ILCR Summation =

6.2E-11

Compound	CDI (mg/kg-d)	RID (mg/kg-d)	HQ (unitless)	CDI (mg/kg-d)	CSF	ILCR (unitless)
1,1-dichloroethene	2.66E-07	9.00E-03	2.95E-05	9.50E-08	NA	NA
1,2,4-trimethylbenzene	4.54E-10	2.00E-03	2.27E-07	1.62E-10	NA	NA
1,3,5-trimethylbenzene	9.06E-10	2.00E-03	4.53E-07	3.24E-10	NA	NA
aroclor 1248	NA	7.00E-05	NA	NA	7.70E+00	NA
aroclor 1254	NA	7.00E-05	NA	NA	7.70E+00	NA
aroclor 1260	NA	7.00E-05	NA	NA	7.70E+00	NA
arsenic	NA	3.00E-04	NA	NA	1.20E+01	NA
benzo(a)anthracene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(a)pyrene	NA	4.00E-02	NA	NA	3.90E+00	NA
benzo(b)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(k)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA	NA	8.40E-03	NA
chrysene	NA	4.00E-02	NA	NA	3.90E-02	NA
dibenz(a,h)anthracene	NA	4.00E-02	NA	NA	4.10E+00	NA
fluoranthene	NA	4.00E-02	NA	NA	NA	NA
indenol(1,2,3-cd)pyrene	NA	4.00E-02	NA	NA	3.90E-01	NA
naphthalene	NA	4.00E-02	NA	NA	NA	NA
n-butylbenzene	3.20E-10	2.90E-01	1.10E-09	1.14E-10	NA	NA
n-propylbenzene	9.76E-10	2.90E-01	3.37E-09	3.49E-10	NA	NA
p-cymene	5.75E-11	1.00E-01	5.75E-10	2.05E-11	NA	NA
phenanthrene	NA	3.00E-01	NA	NA	NA	NA
pyrene	NA	3.00E-02	NA	NA	NA	NA
tetrachloroethene	4.11E-09	1.00E-02	4.11E-07	1.47E-09	2.10E-02	3.08E-11
trichloroethene	8.85E-09	7.35E-03	1.20E-06	3.16E-09	1.00E-02	3.16E-11
xylenes	6.20E-10	2.00E-01	3.10E-09	2.22E-10	NA	NA
HQ Summation =			3.2E-05			
ILCR Summation =			6.2E-11			

Table B-17
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Outdoor Air

Intake Equation	=	{Ci + (Cs X 1/PEF)} X EFF X ED X ET X IR BW X AT					
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m³/h					
EF	Exposure frequency	125 days/year					
EDn	Exposure duration for non-carcinogens	25 year					
EDc	Exposure duration for carcinogens	25 year					
BW	Body weight	70 kg					
ATc	Average time for carcinogens (lifetime)	25550 days					
ATn	Average time for non-carcinogens (EDn x 365)	9125 days					
ET	Exposure time outdoor	4 h/d					
Ci	Concentration of volatiles in ambient air	(see Table 5-6) (see Section 5.3.1.2)					
PEF	Particulate Emission Factor (see Table below)						
Chemical Concentrations	Soil Compound	Volatile Conc (mg/kg) (m³/kg)	PEF	Volatile Concentration (mg/m³)	Soil Compound	Conc (mg/kg) PEF	Volatile Concentration (mg/m³)
1,1-dichloroethene	2.57E-03	NA	1.24E-05	naphthalene	2.05E-01	4.77E+09	NA
1,2,4-trimethylbenzene	3.82E-03	NA	2.38E-08	n-butylbenzene	2.81E-03	NA	1.43E-08
1,3,5-trimethylbenzene	2.96E-03	NA	4.37E-08	n-propylbenzene	2.57E-03	NA	4.48E-08
aroclor 1248	3.69E-02	4.77E+09	NA	p-cymene	2.47E-03	NA	2.61E-09
aroclor 1254	3.29E-02	4.77E+09	NA	phenanthrene	2.03E-01	4.77E+09	NA
aroclor 1260	2.08E-02	4.77E+09	NA	pyrene	3.12E-01	4.77E+09	NA
arsenic	1.56E+00	4.77E+09	NA	tetrachloroethene	2.69E-03	NA	1.70E-07
benzo(a)anthracene	2.43E-01	4.77E+09	NA	trichloroethene	2.63E-03	NA	4.46E-07
benzo(a)pyrene	3.39E-01	4.77E+09	NA	xylenes	2.34E-03	NA	2.79E-08
benzo(b)fluoranthene	3.91E-01	4.77E+09	NA				
benzo(k)fluoranthene	3.06E-01	4.77E+09	NA				
bis(2-ethylhexyl)phthalate	2.58E-01	4.77E+09	NA				
chrysene	2.86E-01	4.77E+09	NA				
dibenz(a,h)anthracene	1.36E-01	4.77E+09	NA				
fluoranthene	2.66E-01	4.77E+09	NA				
indeno(1,2,3-cd)pyrene	3.33E-01	4.77E+09	NA				

Table B-17 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 1
Via Inhalation of Outdoor Air

Non-Carcinogenic Calculation			Carcinogenic Calculation		
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	Compound	CDI (mg/kg-d)
1,1-dichloroethene	2.01E-07	9.00E-03	2.24E-05	1,1-dichloroethene	7.19E-08
1,2,4-trimethylbenzene	3.87E-10	2.00E-03	1.93E-07	1,2,4-trimethylbenzene	1.38E-10
1,3,5-trimethylbenzene	7.10E-10	2.00E-03	3.55E-07	1,3,5-trimethylbenzene	2.54E-10
aroclor 1248	1.26E-13	7.00E-05	1.79E-09	aroclor 1248	4.48E-14
aroclor 1254	1.12E-13	7.00E-05	1.59E-09	aroclor 1254	3.99E-14
aroclor 1260	7.08E-14	7.00E-05	1.01E-09	aroclor 1260	2.55E-14
arsenic	5.31E-12	3.00E-04	1.77E-08	arsenic	1.90E-12
benzo(a)anthracene	8.27E-13	4.00E-02	2.07E-11	benzo(a)anthracene	2.95E-13
benzo(a)pyrene	1.15E-12	4.00E-02	2.88E-11	benzo(a)pyrene	4.12E-13
benzo(b)fluoranthene	1.33E-12	4.00E-02	3.33E-11	benzo(b)fluoranthene	4.75E-13
benzo(k)fluoranthene	1.04E-12	4.00E-02	2.60E-11	benzo(k)fluoranthene	3.72E-13
bis(2-ethylhexyl)phthalate	8.78E-13	2.00E-02	4.39E-11	bis(2-ethylhexyl)phthalate	3.13E-13
chrysene	9.73E-13	4.00E-02	2.43E-11	chrysene	3.48E-13
dibenz(a,h)anthracene	4.63E-13	4.00E-02	1.16E-11	dibenz(a,h)anthracene	1.65E-13
fluoranthene	9.05E-13	4.00E-02	2.26E-11	fluoranthene	3.23E-13
indenol(1,2,3-cd)pyrene	1.13E-12	4.00E-02	2.83E-11	indenol(1,2,3-cd)pyrene	4.05E-13
naphthalene	6.97E-13	4.00E-02	1.74E-11	naphthalene	2.49E-13
n-butylbenzene	2.32E-10	2.90E-01	8.01E-10	n-butylbenzene	8.30E-11
n-propylbenzene	7.28E-10	2.90E-01	2.51E-09	n-propylbenzene	2.60E-10
p-cymene	4.24E-11	1.00E-01	4.24E-10	p-cymene	1.51E-11
phenanthrene	6.91E-13	3.00E-01	2.30E-12	phenanthrene	2.47E-13
pyrene	1.06E-12	3.00E-02	3.54E-11	pyrene	3.79E-13
tetrachloroethylene	2.76E-09	1.00E-02	2.76E-07	tetrachloroethylene	9.86E-10
trichloroethylene	7.24E-09	7.35E-03	9.86E-07	trichloroethylene	2.59E-09
xylenes	4.53E-10	2.00E-01	2.27E-09	xylenes	1.62E-10
HQ Summation =			2.4E-05	ILCR Summation =	7.3E-11

Table B-18
Summary of Potential Health Effects
DTSC Commercial/Industrial Worker AOPC 2

Exposure Pathway	Receptor Hazard Quotient
Inhalation of Indoor Air	4.4E-05
Inhalation of Outdoor Air	2.4E-05
Incidental Ingestion of Soil	1.9E-04
Dermal Contact with Soil	7.7E-04
Total Population Hazard Quotient =	1.0E-03

Exposure Pathway	Receptor Incremental Lifetime Cancer Risk
Inhalation of Indoor Air	8.3E-11
Inhalation of Outdoor Air	4.9E-11
Incidental Ingestion of Soil	3.7E-07
Dermal Contact with Soil	2.1E-06
Total Population Incremental Lifetime Cancer Risk =	2.5E-06

Table B-9
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Incidental Ingestion of Soils

Intake Equation	$CS \times EF \times ED \times CF \times IR$ = $BW \times AT$	Concentration (mg/kg)	Compound	Concentration (mg/kg)	
IRs	Ingestion rate of soil (RAGS, 1989)	50 mg/day	naphthalene	2.15E-01	
CF	Conversion factor	1.0E-06 kg/mg	n-butylbenzene	6.18E-03	
EF	Exposure frequency	125 d/year	n-propylbenzene	5.78E-03	
EDn	Exposure duration for non-carcinogens	25 year	p-cymene	6.45E-03	
EDc	Exposure duration for carcinogens	25 year	phenanthrene	1.42E-01	
BW	Body weight	70 kg	pyrene	1.28E-01	
ATc	Average time for carcinogens (lifetime)	25550 day	tetrachloroethene	4.53E-03	
ATn	Average time for non-carcinogens (EDn x 365)	9125 day	trichloroethylene	8.56E-03	
CS	Concentration of chemicals in soil (see Table 5-1)		xylenes	6.45E-03	
Chemical Concentrations					
Compound	Concentration (mg/kg)	Compound	Concentration (mg/kg)	Compound	
1,1-dichloroethene	4.05E-03	benzo(b)fluoranthene	2.28E-01	benzo(a)anthracene	2.24E-01
1,2,4-trimethylbenzene	1.85E-02	benzo(k)fluoranthene	2.05E-01	benzo(a)pyrene	1.06E-01
1,3,5-trimethylbenzene	8.93E-03	bis(2-ethylhexyl)phthalate	1.03E-01	benzo(b)fluoranthene	1.72E-02
aroclor 1248	1.63E-02	chrysene	1.22E-01	benzo(a,h)anthracene	8.54E-02
aroclor 1254	1.63E-02	fluoranthene	1.18E-01	fluoranthene	2.12E-01
aroclor 1260	1.72E-02	indeno(1,2,3-cd)pyrene		indeno(1,2,3-cd)pyrene	
arsenic					

Table B-19 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC-2
Via Incidental Ingestion of Soils

Compound	Non-Carcinogenic Calculation			Carcinogenic Calculation		
	CDI (mg/kg-d)	RID (mg/kg-d)	UH (unitless)	Compound	CDI (mg/kg-d)	CSF (mg/kg-d) ⁻¹
1,1-dichloroethene	9.91E-10	9.00E-03	1.10E-07	1,1-dichloroethylene	3.54E-10	NA
1,2,4-trimethylbenzene	4.53E-09	5.00E-01	9.05E-09	1,2,4-trimethylbenzene	1.62E-09	NA
1,3,5-trimethylbenzene	2.18E-09	5.00E-01	4.37E-09	1,3,5-trimethylbenzene	7.80E-10	NA
aroclor 1248	3.99E-09	7.00E-05	5.70E-05	aroclor 1248	1.42E-09	7.70E+00
aroclor 1254	3.99E-09	7.00E-05	5.70E-05	aroclor 1254	1.42E-09	7.70E+00
aroclor 1260	4.21E-09	7.00E-05	6.01E-05	aroclor 1260	1.50E-09	7.70E+00
arsenic	NA	3.00E-04	NA	arsenic	NA	1.50E+00
benzo(a)anthracene	2.59E-08	4.00E-02	6.48E-07	benzo(a)anthracene	9.26E-09	1.15E+00
benzo(a)pyrene	5.48E-08	4.00E-02	1.37E-06	benzo(a)pyrene	1.96E-08	1.15E+1
benzo(b)fluoranthene	5.58E-08	4.00E-02	1.39E-06	benzo(b)fluoranthene	1.99E-08	1.15E+00
benzo(k)fluoranthene	5.01E-08	4.00E-02	1.25E-06	benzo(k)fluoranthene	1.79E-08	1.15E+00
bis(2-ethylhexyl)phthalate	2.52E-08	2.00E-02	1.26E-06	bis(2-ethylhexyl)phthalate	9.00E-09	8.40E-03
chrysene	2.98E-08	4.00E-02	7.46E-07	chrysene	1.07E-08	1.15E-01
dibenzo(a,h)anthracene	2.09E-08	4.00E-02	5.22E-07	dibenzo(a,h)anthracene	7.46E-09	4.10E-00
fluoranthene	2.89E-08	4.00E-02	7.22E-07	fluoranthene	1.03E-08	NA
indenof(1,2,3-cd)pyrene	5.19E-08	4.00E-02	1.30E-06	indenof(1,2,3-cd)pyrene	1.83E-08	1.15E+00
naphthalene	5.26E-08	4.00E-02	1.31E-06	naphthalene	1.88E-08	NA
n-butylbenzene	1.51E-09	1.00E-01	1.51E-08	n-butylbenzene	5.40E-10	NA
n-propylbenzene	1.41E-09	1.00E-01	1.41E-08	n-propylbenzene	5.05E-10	NA
p-cymene	1.58E-09	1.00E-01	1.58E-08	p-cymene	5.63E-10	NA
phenanthrene	3.47E-08	3.00E-01	1.16E-07	phenanthrene	1.24E-08	NA
pyrene	3.13E-08	3.00E-02	1.04E-06	pyrene	1.12E-08	NA
tetrachloroethene	1.11E-09	1.00E-02	1.11E-07	tetrachloroethene	3.96E-10	5.10E-02
trichloroethene	2.09E-09	7.35E-03	2.83E-07	trichloroethene	7.48E-10	1.50E-02
xylenes	1.58E-09	2.00E+00	7.89E-10	xylenes	5.63E-10	NA
HQ Summation =				ILCR Summation =	1.9E-04	3.7E-07

Table B-20
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Dermal Contact with Soils

$$\text{Intake Equation} = \frac{\text{CS} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{AF} \times \text{ABS} \times \text{SA}}{\text{BW} \times \text{AT}}$$

SA	Surface area of exposed skin (50th percentile, hands only)	2020 cm ² /day
AF	Adherence Factor	1 mg/cm ²
ABS	Absorption Factor (see table below)	cs _v
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	125 d/year
ED _n	Exposure duration for non-carcinogens	25 year
ED _c	Exposure duration for carcinogens	25 year
BW	Body weight	70 kg
AT _c	Average time for carcinogens (lifetime)	25550 day
AT _n	Average time for non-carcinogens (ED _n x 365)	9125 day
CS	Concentration of chemicals in soil (see Table 5-1)	

Chemical Concentrations

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
1,1-dichloroethene	1.00E-01	4.05E-03	naphthalene	1.50E-01	2.15E-01
1,2,4-trimethylbenzene	1.00E-01	1.85E-02	n-butylbenzene	1.00E-01	6.18E-03
1,3,5-trimethylbenzene	1.00E-01	8.93E-03	n-propylbenzene	1.00E-01	5.78E-03
aroclor 1248	1.00E-01	1.63E-02	p-cymene	1.00E-01	6.45E-03
aroclor 1254	1.00E-01	1.63E-02	phenanthrene	1.50E-01	1.42E-01
aroclor 1260	1.00E-01	1.72E-02	pyrene	1.50E-01	1.28E-01
arsenic	3.00E-02	NA	tetrachloroethene	1.00E-01	4.53E-03
benzo(a)anthracene	1.50E-01	1.06E-01	trichloroethene	1.00E-01	8.56E-03
benzo(a)pyrene	1.50E-01	2.24E-01	xylenes	1.00E-01	6.45E-03
benzo(b)fluoranthene	1.50E-01	2.28E-01			
benzo(k)fluoranthene	1.50E-01	2.05E-01			
bis(2-ethylhexyl)phthalate	1.00E-01	1.03E-01			
chrysene	1.50E-01	1.22E-01			
dibenz(a,h)anthracene	1.50E-01	8.54E-02			
fluoranthene	1.00E-01	1.18E-01			
indeno(1,2,3-cd)pyrene	1.00E-01	2.12E-01			

Table B-20 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Dermal Contact with Soils

Non-Carcinogenic Calculation				Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RFID (mg/kg-d)	UH (unitless)	Compound	CDI (mg/kg-d)	CSF (mg/kg-d) _i	UR (unitless)
1,1-dichloroethene	4.00E-09	9.00E-03	4.45E-07	1,1-dichloroethene	1.43E-09	NA	NA
1,2,4-trimethylbenzene	1.83E-08	5.00E-01	3.66E-08	1,2,4-trimethylbenzene	6.33E-09	NA	NA
1,3,5-trimethylbenzene	8.83E-09	5.00E-01	1.77E-08	1,3,5-trimethylbenzene	3.15E-09	NA	NA
aroclor 1248	1.61E-08	7.00E-05	2.30E-04	aroclor 1248	5.75E-09	7.70E+00	4.43E-08
aroclor 1254	1.61E-08	7.00E-05	2.30E-04	aroclor 1254	5.75E-09	7.70E+00	4.43E-08
aroclor 1260	1.70E-08	7.00E-05	2.43E-04	aroclor 1260	6.07E-09	7.70E+00	4.67E-08
arsenic	NA	3.00E-04	NA	arsenic	1.50E+00	NA	NA
benzo(a)anthracene	1.57E-07	4.00E-02	3.93E-06	benzo(a)anthracene	5.61E-08	1.15E+00	6.45E-08
benzo(a)pyrene	3.32E-07	4.00E-02	8.30E-06	benzo(a)pyrene	1.19E-07	1.15E+01	1.36E-06
benzo(b)fluoranthene	3.38E-07	4.00E-02	8.45E-06	benzo(b)fluoranthene	1.21E-07	1.15E+00	1.39E-07
benzo(k)fluoranthene	3.04E-07	4.00E-02	7.60E-06	benzo(k)fluoranthene	1.09E-07	1.15E+00	1.25E-07
bis(2-ethylhexyl)phthalate	1.02E-07	2.00E-02	5.09E-06	bis(2-ethylhexyl)phthalate	3.64E-08	8.40E-03	3.05E-10
chrysene	1.81E-07	4.00E-02	4.52E-06	chrysene	6.46E-08	1.15E-01	7.43E-09
dibenz(a,h)anthracene	1.27E-07	4.00E-02	3.16E-06	dibenz(a,h)anthracene	4.52E-08	4.10E+00	1.85E-07
fluoranthene	1.17E-07	4.00E-02	2.92E-06	fluoranthene	4.16E-08	NA	NA
indenot(1,2,3-cd)pyrene	2.10E-07	4.00E-02	5.24E-06	indenot(1,2,3-cd)pyrene	7.48E-08	1.15E+00	8.60E-08
naphthalene	3.19E-07	4.00E-02	7.97E-06	naphthalene	1.14E-07	NA	NA
n-butylbenzene	6.11E-09	1.00E-01	6.11E-08	n-butylbenzene	2.10E-09	NA	NA
n-propylbenzene	5.71E-09	1.00E-01	5.71E-08	n-propylbenzene	2.04E-09	NA	NA
p-cymene	6.37E-09	1.00E-01	6.37E-08	p-cymene	2.28E-09	NA	NA
phenanthrene	2.10E-07	3.00E-01	7.02E-07	phenanthrene	7.52E-08	NA	NA
pyrene	1.90E-07	3.00E-02	6.32E-06	pyrene	6.78E-08	NA	NA
tetrachloroethene	4.48E-09	1.00E-02	4.48E-07	tetrachloroethene	1.60E-09	5.10E-02	8.15E-11
trichloroethene	8.46E-09	7.33E-03	1.15E-06	trichloroethene	3.02E-09	1.50E-02	4.53E-11
xylenes	6.37E-09	2.00E-00	3.19E-09	xylenes	2.28E-09	NA	NA

775 64

UICB Summation = 31E.06

Table B-21
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Indoor Air

Intake Equation	=	C _i X E _E X E _D X E _T X I _R BW X AT
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m ³ /h
EF	Exposure frequency	125 days/year
ED _n	Exposure duration for non-carcinogens	25 year
ED _c	Exposure duration for carcinogens	25 year
BW	Body weight	70 kg
AT _c	Average time for carcinogens (lifetime)	25550 days
AT _n	Average time for non-carcinogens (ED _n x 365)	9125 days
ET	Exposure time indoor	4 h/d
C _i	Concentration of chemicals indoors (indoor + outdoor) (see Tables 5-6 and 5-7)	
Chemical Concentrations	Compound	Concentration (mg/m ³)
	naphthalene	NA
	n-butylbenzene	2.53E-08
	n-propylbenzene	8.01E-08
	p-cymene	4.65E-09
	phenanthrene	NA
	pyrene	NA
	tetrachloroethene	2.90E-07
	trichloroethene	8.25E-07
	xylenes	3.01E-08
I,1-dichloroethene		2.23E-05
1,2,4-trimethylbenzene		4.45E-08
1,3,5-trimethylbenzene		7.97E-08
aroclor 1248		NA
aroclor 1254		NA
aroclor 1260		NA
arsenic		NA
benzo(a)anthracene		NA
benzo(a)pyrene		NA
benzo(b)fluoranthene		NA
benzo(k)fluoranthene		NA
bis(2-ethylhexyl)phthalate		NA
chrysene		NA
dibenzo(a,h)anthracene		NA
fluoranthene		NA
indeno(1,2,3-cd)pyrene		NA

Table B-21 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Indoor Air

Compound	Non-Carcinogenic Calculation			
	CDI (mg/kg-d)	RTD (mg/kg-d)	RQ	HQ (unitless)
1,1-dichloroethene	3.62E-07	9.00E-03	4.02E-05	
1,2,4-trimethylbenzene	7.23E-10	2.00E-03	3.61E-07	
1,3,5-trimethylbenzene	1.29E-09	2.00E-03	6.47E-07	
aroclor 1248	NA	7.00E-05	NA	
aroclor 1254	NA	7.00E-05	NA	
aroclor 1260	NA	7.00E-05	NA	
benz(a)anthracene	NA	3.00E-04	NA	
benz(b)fluoranthene	NA	4.00E-02	NA	
benz(k)fluoranthene	NA	4.00E-02	NA	
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA	
chrysene	NA	4.00E-02	NA	
dibenz(a,h)anthracene	NA	4.00E-02	NA	
fluoranthene	NA	4.00E-02	NA	
indeno(1,2,3-cd)pyrene	NA	4.00E-02	NA	
naphthalene	NA	4.00E-02	NA	
n-butylbenzene	4.11E-10	2.90E-01	1.42E-09	
n-propylbenzene	1.30E-09	2.90E-01	4.49E-09	
p-cymene	7.55E-11	1.00E-01	7.55E-10	
phenanthrene	NA	3.00E-01	NA	
pyrene	NA	3.00E-02	NA	
tetrachloroethene	4.71E-09	1.00E-02	4.71E-07	
trichloroethene	1.34E-08	7.35E-03	1.82E-06	
xylenes	4.88E-10	2.00E-01	2.44E-09	

HO Summation = 4 4E-05

Compound	Carcinogenic Calculation			ILCR (unitless)
	CDI (mg/kg-d)	CSF (mg/kg-d) ₁	CSF (mg/kg-d) ₂	
1,1-dichloroethene	1.29E-07	NA	NA	NA
1,2,4-trimethylbenzene	2.58E-10	NA	NA	NA
1,3,5-trimethylbenzene	4.62E-10	NA	NA	NA
aeroclor 1248	NA	7.70E+00	NA	NA
aeroclor 1254	NA	7.70E+00	NA	NA
aeroclor 1260	NA	7.70E+00	NA	NA
arsenic	NA	1.20E+01	NA	NA
benzo(a)anthracene	NA	3.90E+01	NA	NA
benzo(a)pyrene	NA	3.90E+00	NA	NA
benzo(b)fluoranthene	NA	3.90E+01	NA	NA
benzo(k)fluoranthene	NA	3.90E+01	NA	NA
bis(2-ethylhexyl)phthalate	NA	8.40E-03	NA	NA
chrysene	NA	3.90E-02	NA	NA
dibenz(a,h)anthracene	NA	4.10E+00	NA	NA
fluoranthene	NA	NA	NA	NA
inden(1,2,3-cd)pyrene	NA	3.90E-01	NA	NA
naphthalene	NA	NA	NA	NA
n-butylbenzene	1.47E-10	NA	NA	NA
n-propylbenzene	4.65E-10	NA	NA	NA
p-cymene	2.70E-11	NA	NA	NA
phenanthrene	NA	NA	NA	NA
pyrene	NA	NA	NA	NA
tetrachloroethene	1.68E-09	2.10E-02	3.53E-11	
trichloroethene	4.79E-09	1.00E-02	4.79E-11	
xylenes	1.74E-10	NA	NA	

WCB Summation = 83E-11

Table B-22
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Outdoor Air

Intake Equation	=	$\{Cl_i + (Cs_i X I_i/PEF)\} X EF X ED_i X ET_i X IR$ BW X AT				
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m³/h				
EF	Exposure frequency	125 days/year				
EDn	Exposure duration for non-carcinogens	25 year				
EDc	Exposure duration for carcinogens	25 year				
BW	Body weight	70 kg				
ATc	Average time for carcinogens (lifetime)	25550 days				
ATn	Average time for non-carcinogens (EDn x 365)	9125 days				
ET	Exposure time outdoor	4. hid				
Ci	Concentration of chemicals outdoors	(see Table 5-6) (see Section 5.3.1.2)				
PEF	Particulate Emission Factor					
Chemical Concentrations	Soil Compound	PEF Conc (mg/kg) (m³/kg)	Volatile PEF Concentration (mg/m³)	Soil Compound	PEF Conc (mg/kg)	Volatile PEF Concentration (mg/m³)
1,1-dichloroethene	4.05E-03 NA	1.24E-05	naphthalene	2.15E-01	4.77E+09	NA
1,2,4-trimethylbenzen	1.85E-02 NA	2.38E-08	n-butylbenzene	6.18E-03	NA	1.43E-08
1,3,5-trimethylbenzen	8.93E-03 NA	4.37E-08	n-propylbenzene	5.78E-03	NA	4.48E-08
aroclor 1248	1.63E-02 4.77E+09 NA		p-cymene	6.45E-03	NA	2.61E-09
aroclor 1254	1.63E-02 4.77E+09 NA		phenanthrene	1.42E-01	4.77E+09	NA
aroclor 1260	1.72E-02 4.77E+09 NA		pyrene	1.28E-01	4.77E+09	NA
arsenic	NA	4.77E+09 NA	tetrachloroethene	4.53E-03	NA	1.70E-07
benzo(a)anthracene	1.06E-01	4.77E+09 NA	trichloroethene	8.56E-03	NA	4.46E-07
benzo(a)pyrene	2.24E-01	4.77E+09 NA	xylenes	6.45E-03	NA	2.79E-08
benzo(b)fluoranthene	2.28E-01	4.77E+09 NA				
benzo(k)fluoranthene	2.05E-01	4.77E+09 NA				
bis(2-ethylhexyl)phthalate	1.03E-01	4.77E+09 NA				
chrysene	1.22E-01	4.77E+09 NA				
dibenz(a,h)anthracen	8.54E-02	4.77E+09 NA				
fluoranthene	1.18E-01	4.77E+09 NA				
indeno(1,2,3-cd)pyren	2.12E-01	4.77E+09 NA				

Table B-22 (cont.)
Summary of Risk Quantitation
DTSC On-Site Commercial/Industrial Worker AOPC 2
Via Inhalation of Outdoor Air

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)
1,1-dichloroethene	2.01E-07	9.00E-03	2.24E-05
1,2,4-trimethylbenzene	3.87E-10	2.00E-03	1.93E-07
1,3,5-trimethylbenzene	7.10E-10	2.00E-03	3.55E-07
aeroclor 1248	5.55E-14	7.00E-05	7.92E-10
aeroclor 1254	5.55E-14	7.00E-05	7.92E-10
aeroclor 1260	5.89E-14	7.00E-05	8.36E-10
arsenic		3.00E-04	NA
benzo(a)anthracene	3.61E-13	4.00E-02	9.02E-12
benzo(a)pyrene	7.62E-13	4.00E-02	1.91E-11
benzo(b)fluoranthene	7.76E-13	4.00E-02	1.94E-11
benzo(k)fluoranthene	6.91E-13	4.00E-02	1.74E-11
bis(2-ethylhexyl)phthalate	3.50E-13	2.00E-02	1.75E-11
chrysene	4.15E-13	4.00E-02	1.04E-11
dibenzo(a,h)anthracene	2.91E-13	4.00E-02	7.26E-12
fluoranthene	4.01E-13	4.00E-02	1.00E-11
indeno(1,2,3-cd)pyrene	7.21E-13	4.00E-02	1.80E-11
naphthalene	7.31E-13	4.00E-02	1.83E-11
n-butylbenzene	2.32E-10	2.90E-01	8.01E-10
n-propylbenzene	7.28E-10	2.90E-01	2.51E-09
p-cymene	4.24E-11	1.00E-01	4.24E-10
phenanthrene	4.83E-13	3.00E-01	1.61E-12
pyrene	4.35E-13	3.00E-02	1.45E-11
tetrachloroethene	2.76E-09	1.00E-02	2.76E-07
trichloroethene	7.24E-09	7.35E-03	9.86E-07
xylenes	4.53E-10	2.00E-01	2.27E-09
HQ Summation =			2.4E-05

HQ Summation = 2.4E-05

ILCR Summation = 4.9E-11

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d)	ILCR (unitless)
1,1-dichloroethene	7.19E-08	NA	NA
1,2,4-trimethylbenzene	1.38E-10	NA	NA
1,3,5-trimethylbenzene	2.54E-10	NA	NA
aeroclor 1248	1.98E-14	7.70E+00	1.53E-13
aeroclor 1254	1.98E-14	7.70E+00	1.53E-13
aeroclor 1260	2.09E-14	7.70E+00	1.61E-13
arsenic	NA	1.20E+01	NA
benzo(a)anthracene	1.29E-13	3.90E-01	5.02E-14
benzo(a)pyrene	2.72E-13	3.90E+00	1.06E-12
benzo(b)fluoranthene	2.77E-13	3.90E-01	1.08E-13
benzo(k)fluoranthene	2.49E-13	3.90E-01	9.71E-14
bis(2-ethylhexyl)phthalate	1.25E-13	8.40E-03	1.05E-15
chrysene	1.48E-13	3.90E-02	5.78E-15
dibenzo(a,h)anthracene	1.04E-13	4.10E+00	4.25E-13
fluoranthene	1.43E-13	NA	NA
indeno(1,2,3-cd)pyrene	2.58E-13	3.90E-01	1.00E-13
naphthalene	2.61E-13	NA	NA
n-butylbenzene	8.30E-11	NA	NA
n-propylbenzene	2.60E-10	NA	NA
p-cymene	1.51E-11	NA	NA
phenanthrene	1.73E-13	NA	NA
pyrene	1.56E-13	NA	NA
tetrachloroethene	9.86E-10	2.10E-02	2.07E-11
trichloroethene	2.59E-09	1.00E-02	2.59E-11
xylenes	1.62E-10	NA	NA

Table B-23
Summary of Potential Health Effects
Off-Site Commercial/Industrial Worker

Exposure Pathway	Receptor Hazard Quotient
Inhalation of Outdoor Air	2.5E-05
Total Population Hazard Quotient =	2.5E-05

Exposure Pathway	Receptor Incremental Lifetime Cancer Risk
Inhalation of Outdoor Air	5.2E-11
Total Population Incremental Lifetime Cancer Risk =	5.2E-11

Table B-24
Summary of Risk Quantification
Off-Site Commercial/Industrial Worker
Via Inhalation of Outdoor Air

Intake Equation	=	CS X EF X ED X ET X IR BW X AT
IR	Inhalation rate of gases (RAGS, 1989)	0.83 m ³ /h
EF	Exposure frequency	125 days/year
EDn	Exposure duration for non-carcinogens	25 year
EDc	Exposure duration for carcinogens	25 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	23550 days
ATn	Average time for non-carcinogens (EDn x 365)	9125 days
ET	Exposure time outdoors	8 h/d
Ci	Concentration of chemicals indoors (see Table 5-6)	
Chemical Concentrations		
Compound	Concentration (mg/m ³)	Concentration (mg/m ³)
naphthalene	NA	NA
n-butylbenzene	8.90E-09	2.54E-08
n-propylbenzene		1.54E-09
p-cymene		
phenanthrene	NA	NA
pyrene		1.36E-07
terachloroethene		1.66E-07
trichloroethene		1.70E-08
xylenes		
1,1-dichloroethene	6.57E-06	
1,2,4-trimethylbenzene	7.04E-09	
1,3,5-trimethylbenzene	2.01E-08	
aroclor 1248	NA	
aroclor 1254	NA	
aroclor 1260	NA	
arsenic	NA	
benzo(a)anthracene	NA	
benzo(a)pyrene	NA	
benzo(b)fluoranthene	NA	
benzo(k)fluoranthene	NA	
bis(2-ethylhexyl)phthalate	NA	
chrysene	NA	
dibenz(a,h)anthracene	NA	
fluoranthene	NA	
indenot(1,2,3-cd)pyrene	NA	

Table B-24 (cont.)
Summary of Risk Quantitation
Off-Site Commercial/Industrial Worker
Via Inhalation of Outdoor Air

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RD (mg/kg-d)	HQ (unitless)
1,1-dichloroethene	2.13E-07	9.00E-03	2.37E-05
1,2,4-trimethylbenzene	2.29E-10	2.00E-03	1.14E-07
1,3,5-trimethylbenzene	6.53E-10	2.00E-03	3.26E-07
aeroclor 1248	NA	7.00E-05	NA
aeroclor 1254	NA	7.00E-05	NA
aeroclor 1260	NA	7.00E-05	NA
arsenic	NA	3.00E-04	NA
benzo(a)anthracene	NA	4.00E-02	NA
benzo(a)pyrene	NA	4.00E-02	NA
benzo(b)fluoranthene	NA	4.00E-02	NA
benzo(k)fluoranthene	NA	4.00E-02	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA
chrysene	NA	4.00E-02	NA
dibenz(a,h)anthracene	NA	4.00E-02	NA
fluoranthene	NA	4.00E-02	NA
indeno(1,2,3-cd)pyrene	NA	4.00E-02	NA
naphthalene	NA	4.00E-02	NA
n-butylbenzene	2.89E-10	2.90E-01	9.97E-10
n-propylbenzene	8.25E-10	2.90E-01	2.85E-09
p-cymene	5.00E-11	1.00E-01	5.00E-10
phenanthrene	NA	3.00E-01	NA
pyrene	NA	3.00E-02	NA
tetrachloroethene	4.42E-09	1.00E-02	4.42E-07
trichloroethene	5.39E-09	7.35E-03	7.34E-07
xylenes	5.52E-10	2.00E-01	2.76E-09

Compound	CDI (mg/kg-d)	CSF (mg/kg-d) ₋₁	Carcinogenic Calculation	ILCR (unitless)
1,1-dichloroethene	7.62E-08	NA	NA	NA
1,2,4-trimethylbenzene	8.17E-11	NA	NA	NA
1,3,5-trimethylbenzene	2.33E-10	NA	NA	NA
aeroclor 1248	NA	7.70E+00	NA	NA
aeroclor 1254	NA	7.70E+00	NA	NA
aeroclor 1260	NA	7.70E+00	NA	NA
arsenic	NA	1.20E+01	NA	NA
benzo(a)anthracene	NA	3.90E-01	NA	NA
benzo(a)pyrene	NA	3.90E+00	NA	NA
benzo(b)fluoranthene	NA	3.90E-01	NA	NA
benzo(k)fluoranthene	NA	3.90E-01	NA	NA
bis(2-ethylhexyl)phthalate	NA	8.40E-03	NA	NA
chrysene	NA	3.90E-02	NA	NA
dibenz(a,h)anthracene	NA	4.10E+00	NA	NA
fluoranthene	NA	NA	NA	NA
inden(1,2,3-cd)pyrene	NA	3.90E-01	NA	NA
naphthalene	NA	NA	NA	NA
n-butylbenzene	1.03E-10	NA	NA	NA
n-propylbenzene	2.95E-10	NA	NA	NA
p-cymene	1.79E-11	NA	NA	NA
phenanthrene	NA	NA	NA	NA
pyrene	NA	NA	NA	NA
tetrachloroethene	1.58E-09	2.10E-02	3.31E-11	
trichloroethene	1.93E-09	1.00E-02	1.93E-11	
xylenes	1.97E-10	NA	NA	

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Table B-25
Summary of Potential Health Effects
Off-Site RME Resident Adult

Exposure Pathway	Receptor Hazard Quotient
Inhalation of Outdoor Air	1.2E-06
Total Population Hazard Quotient =	1.2E-06

Exposure Pathway	Receptor Incremental Lifetime Cancer Risk
Inhalation of Outdoor Air	2.9E-12
Total Population Incremental Lifetime Cancer Risk =	2.9E-12

Table B-26
Summary of Risk Quantitation
Off-Site RME Resident Adult
Via Inhalation of Outdoor Air

Intake Equation	CS X EF X ED X ET X IR BW X AT	Compound	Concentration (mg/m ³)
IR	Inhalation rate of gases (RAGS, 1989)	naphthalene	NA
EF	Exposure frequency	n-butylbenzene	4.96E-11
EDn	Exposure duration for non-carcinogens	n-propylbenzene	1.41E-10
EDc	Exposure duration for carcinogens	p-cymene	8.57E-12
BW	Body weight	phenanthrene	NA
ATc	Average time for carcinogens (lifetime)	pyrene	NA
ATn	Average time for non-carcinogens (EDn x 365)	tetrachloroethene	7.61E-10
ET	Exposure time	trichloroethene	9.09E-10
Ci	Concentration of chemicals Outdoors (see Table 5-6)	xylenes	9.47E-11
Chemical Concentrations	Compound	Concentration (mg/m ³)	Concentration (mg/m ³)
	1,1-dichloroethene	3.65E-08	
	1,2,4-trimethylbenzene	3.83E-11	
	1,3,5-trimethylbenzene	1.11E-10	
	aroclor 1248	NA	
	aroclor 1254	NA	
	aroclor 1260	NA	
	arsenic	NA	
	benzo(a)anthracene	NA	
	benzo(a)pyrene	NA	
	benzo(b)fluoranthene	NA	
	benzo(k)fluoranthene	NA	
	bis(2-ethylhexyl)phthalate	NA	
	chrysene	NA	
	dibenz(a,h)anthracene	NA	
	fluoranthene	NA	
	indeno(1,2,3-cd)pyrene	NA	

Table B-26 (cont.)
Summary of Risk Quantitative
Off-Site RME Resident Ad
Via Inhalation of Outdoor

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RID (mg/kg-d)	HQ (unitless)
1,1-dichloroethene	9.96E-09	9.000E-03	1.11E-06
1,2,4-trimethylbenzene	1.05E-11	2.000E-03	5.23E-09
1,3,5-trimethylbenzene	3.03E-11	2.000E-03	1.51E-08
arcoior 1248	NA	7.00E-05	NA
arcoior 1254	NA	7.00E-05	NA
arcoior 1260	NA	7.00E-05	NA
arsenic	NA	3.00E-04	NA
benzo(a)anthracene	NA	4.00E-02	NA
benzo(a)pyrene	NA	4.00E-02	NA
benzo(b)fluoranthene	NA	4.00E-02	NA
benzo(k)fluoranthene	NA	4.00E-02	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA
chrysene	NA	4.00E-02	NA
dibenzo(a,h)anthracene	NA	4.00E-02	NA
fluoranthene	NA	4.00E-02	NA
indeno[1,2,3-cd]pyrene	NA	4.00E-02	NA
naphthalene	NA	4.00E-02	NA
n-butylbenzene	1.35E-11	2.90E-01	4.67E-11
n-propylbenzene	3.85E-11	2.90E-01	1.33E-10
p-cymene	2.34E-12	1.00E-01	2.34E-11
phenanthrene	NA	3.00E-01	NA
pyrene	NA	3.00E-02	NA
tetrachloroethene	2.08E-10	1.00E-02	2.08E-08
trichloroethene	2.48E-10	7.35E-03	3.37E-08
xylenes	2.58E-11	2.00E-01	1.29E-10
HO Summation =			1.2E-06

II.CB Summation = 29E-12

HO Summation = 1.2E-06

HO Summation =

ICR Summation = 29E-12

Table B-27
Summary of Potential Health Effects
Off-Site RME Resident Child

<u>Exposure Pathway</u>	<u>Receptor Hazard Quotient</u>
Inhalation of Outdoor Air	5.5E-06
Total Population Hazard Quotient =	5.5E-06
<u>Exposure Pathway</u>	<u>Receptor Incremental Lifetime Cancer Risk</u>
Inhalation of Outdoor Air	2.7E-12
Total Population Incremental Lifetime Cancer Risk =	2.7E-12

Table B-28
Summary of Risk Quantitation
Off-Site RME Resident Child
Via Inhalation of Outdoor Air

Intake Equation	CS X EF X ED X ET X IR BW X AT	Compound	Concentration (mg/m ³)
IR	Inhalation rate of gases (RAGS, 1989)	naphthalene	NA
EF	Exposure frequency	n-butylbenzene	4.96E-11
EDn	Exposure duration for non-carcinogens	n-propylbenzene	1.41E-10
EDc	Exposure duration for carcinogens	p-cymene	8.57E-12
BW	Body weight	phenanthrene	NA
ATc	Average time for carcinogens (lifetime)	pyrene	NA
ATn	Average time for non-carcinogens (EDn x 365)	tetrachloroethylene	7.61E-10
ET	Exposure time	trichloroethylene	9.09E-10
Ci	Concentration of chemicals outdoors (see Table 5-6)	xylenes	9.47E-11
Chemical Concentrations	Compound	Concentration (mg/m ³)	Concentration (mg/m ³)
	1,1-dichloroethene	3.63E-08	NA
	1,2,4-trimethylbenzene	3.83E-11	
	1,3,5-trimethylbenzene	1.11E-10	
	aroclor 1248	NA	
	aroclor 1254	NA	
	aroclor 1260	NA	
	arsenic	NA	
	benzo(a)anthracene	NA	
	benzo(a)pyrene	NA	
	benzo(b)fluoranthene	NA	
	bis(2-ethylhexyl)phthalate	NA	
	chrysene	NA	
	dibenz(a,h)anthracene	NA	
	fluoranthene	NA	
	indeno(1,2,3-cd)pyrene	NA	

Table B-28 (cont.)
Summary of Risk Quantitation
Off-Site RME Resident Child
Via Inhalation of Outdoor Air

Compound	Non-Carcinogenic Calculation			Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	HQ (unitless)	CDI (mg/kg-d)	CSF (mg/kg-d) ₋₁	ILCR (unitless)
1,1-dichloroethene	4.65E-08	9.00E-03	5.16E-06	NA	3.98E-09	NA
1,2,4-trimethylbenzene	4.88E-11	2.00E-03	2.44E-08	NA	4.18E-12	NA
1,3,5-trimethylbenzene	1.41E-10	2.00E-03	7.07E-08	NA	1.21E-11	NA
arocloc 1248	NA	7.00E-05	NA	NA	7.70E+00	NA
arocloc 1254	NA	7.00E-05	NA	NA	7.70E+00	NA
arocloc 1260	NA	7.00E-05	NA	NA	7.70E+00	NA
arsenic	NA	3.00E-04	NA	NA	1.20E+01	NA
benzo(a)anthracene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(a)pyrene	NA	4.00E-02	NA	NA	3.90E+00	NA
benzo(b)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
benzo(k)fluoranthene	NA	4.00E-02	NA	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	2.00E-02	NA	NA	8.40E-03	NA
chrysene	NA	4.00E-02	NA	NA	3.90E-02	NA
dibenzo(a,h)anthracene	NA	4.00E-02	NA	NA	4.10E+00	NA
fluoranthene	NA	4.00E-02	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	NA	4.00E-02	NA	NA	3.90E-01	NA
naphthalene	NA	4.00E-02	NA	NA	NA	NA
n-butylbenzene	6.32E-11	2.90E-01	2.18E-10	5.41E-12	NA	NA
n-propylbenzene	1.80E-10	2.90E-01	6.19E-10	1.54E-11	NA	NA
p-cymene	1.09E-11	1.00E-01	1.09E-10	9.35E-13	NA	NA
phenanthrene	NA	3.00E-01	NA	NA	NA	NA
pyrene	NA	3.00E-02	NA	NA	NA	NA
tetrachloroethene	9.69E-10	1.00E-02	9.69E-08	8.31E-11	2.10E-02	1.74E-12
trichloroethene	1.16E-09	7.35E-03	1.57E-07	9.92E-11	1.00E-02	9.92E-13
xylenes	1.21E-10	2.00E-01	6.03E-10	1.03E-11	NA	NA
HQ Summation =			5.5E-06			

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d) ₋₁	ILCR (unitless)
1,1-dichloroethene	NA	3.98E-09	NA
1,2,4-trimethylbenzene	NA	4.18E-12	NA
1,3,5-trimethylbenzene	NA	1.21E-11	NA
arocloc 1248	NA	7.70E+00	NA
arocloc 1254	NA	7.70E+00	NA
arocloc 1260	NA	7.70E+00	NA
arsenic	NA	1.20E+01	NA
benzo(a)anthracene	NA	3.90E-01	NA
benzo(a)pyrene	NA	3.90E+00	NA
benzo(b)fluoranthene	NA	3.90E-01	NA
benzo(k)fluoranthene	NA	3.90E-01	NA
bis(2-ethylhexyl)phthalate	NA	8.40E-03	NA
chrysene	NA	3.90E-02	NA
dibenzo(a,h)anthracene	NA	4.10E+00	NA
fluoranthene	NA	NA	NA
indeno(1,2,3-cd)pyrene	NA	3.90E-01	NA
naphthalene	NA	NA	NA
n-butylbenzene	NA	1.54E-11	NA
n-propylbenzene	NA	9.35E-13	NA
p-cymene	NA	NA	NA
phenanthrene	NA	NA	NA
pyrene	NA	NA	NA
tetrachloroethene	NA	8.31E-11	1.74E-12
trichloroethene	NA	9.92E-11	9.92E-13
xylenes	NA	1.03E-11	NA
ILCR Summation =		2.7E-12	